ARITHMETIC OF COMMERCE

BY

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PREFACE

MANY books on Commercial Arithmetic have been written, but with few exceptions the subject matter is arranged to fall into sections determined by the principles of Arithmetic. This book is arranged on entirely different lines. It is assumed that the students using the book already possess a fair knowledge of the elements of Arithmetic, and thus the arrangement has been made with regard to the methods under which commerce is carried on.

Heads of business houses frequently complain that the young people engaged by them prove unreliable and inept when called upon to make the necessary calculations in connection with the business carried on. In many cases these young people have been considered quite good arithmeticians at school, so that it is evident that lack of application is the cause of their non-success. The *Arithmetic of Commerce* is a nattempt to remedy this failing, for besides the arrangement referred to above, the examples dealt with in any cases are transactions which have actually taken place.

Arithmetic is an exact science, and therefore it is impossible to obtain correct results from vague ideas. A correct result will thus not only prove that the student's Arithmetic has been sound, but also ensure that he has grasped thoroughly the idea underlying the method of carrying out the commercial transaction to which the question refers.

It is hoped that the book will prove of value to students in Secondary and Central schools having a commercial bias, Day Continuation schools and Evening Commercial institutes.

My warmest thanks are due to those examining bodies who have kindly given me permission to use a number of questions recently set at examinations, to those gentlemen who have handed me documents from which data to frame questions have been obtained, and to Mr. J. Stephenson, M.A., M.Com., B.Sc., for valuable advice concerning the arrangement of the subject matter.

<div align="right">P. W. N.</div>

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INTRODUCTION

I. Tables of the Imperial Weights and Measures

Length— *Imperial Standard, the Yard*

12 inches (in.)	= 1 foot (ft.)
3 feet	= 1 yard (yd.)
5½ yards	= 1 rod, pole, or perch
22 yards or 4 poles	= 1 chain (ch.)
10 chains or 40 poles	= 1 furlong (fur.)
1,760 yards or 8 furlongs	= 1 mile (ml.)

Land Measure

100 links	= 22 yards or 1 chain
25 links	= 1 pole
10 chains	= 1 furlong
80 ,,	= 1 mile

Area

144 square inches	= 1 square foot
9 ,, feet	= 1 ,, yard
30¼ ,, yards	= 1 ,, pole
40 ,, poles	= 1 rood (rd.)
4,840 sq. yd. or 4 rd.	= 1 acre (ac.)
10 square chains	= 1 acre
640 acres	= 1 square mile

Volume

1,728 cubic inches	= 1 cubic foot
27 ,, feet	= 1 ,, yard.

Weight— *Imperial Standard, the Pound*
Avoirdupois Weight (Av.)

16 drams (dr.)	= 1 ounce (oz.)
16 ounces	= 1 pound (lb.)
7,000 grains (gr.)	= 1 pound
14 pounds	= 1 stone (st.)
28 pounds	= 1 quarter (qr.)
4 quarters	= 1 hundredweight (cwt.)
20 hundredweights	= 1 ton.

Troy Weight

24 grains (gr.)	= 1 pennyweight (dwt.)
20 pennyweights	= 1 ounce (oz. tr.)
12 ounces	= 1 pound (lb. tr.)
5,760 grains	= 1 pound.

Apothecaries' Weight

20 grains (gr.)	= 1 scruple (Э)
3 scruples	= 1 drachm (ʒ)
8 drachm	= 1 ounce (ʒ) •

NOTE 1.—By the Weights and Measures Act, 1878, all articles sold by weight must be sold by Avoirdupois weight, except precious metals and stones, which are sold by Troy weight, and drugs which, in dispensing, are weighed by Apothecaries' weight. Avoirdupois weight is used in the British Pharmacopoeia.

A grain is the same in all three tables of weight. 1 oz. = 437½ gr., whereas 1 oz. tr. and 1 ʒ each equal 480 gr. The unit " grain " was derived from the weight of a dried grain of wheat.

Capacity—*Imperial Standard, the Gallon*
Dry Measure and Fluid Measure

4 gills	= 1 pint (pt.)
2 pints	= 1 quart (qt.)
4 quarts	= 1 gallon (gall.)

Dry Measure

2 gallons	= 1 peck (pk.)
4 pecks	= 1 bushel (bush.)
8 bushels	= 1 quarter (qr.)

Apothecaries' Fluid Measure

60 minims (min.) or drops	= 1 fluid drachm
8 fluid drachms	= 1 fluid ounce
20 fluid ounces	= 1 Imperial pint
1 tea-spoonful	= 1 fluid drachm
1 dessert-spoonful	= 2 ,, ,,
1 table-spoonful	= 4 ,, ,,

NOTE 2.—The **Imperial Standard** gallon contains **10 lb. weight** of distilled water at 62° F. The relation between Volume and Capacity is **1 gallon = 277·274 cub. in.** 1 fluid ounce or two table-spoonfuls of water at 62° F. weighs 1 oz. av.

II. Metric System of Weights and Measures

Length—*Metric Standard, the Metre*

·001	metre (m.)		= 1 millimetre (mm.)
·01	,,	or 10 mm.	= 1 centimetre (cm.)
·1	,,	,, 10 cm.	= 1 decimetre (dm.)
10	metres		= 1 decametre (Dm.)
100	,,	,, 10 dm.	= 1 hectometre (Hm.)
1,000	,,	,, 10 km.	= 1 kilometre (Km.)
10,000	,,	,, 10 km.	= 1 myriametre (Mm.).

The Metric units of weight and capacity are the **Gram** (gm. or g.) and the **Litre** (l.) respectively. By replacing " metre " in the above table by " gram " and by " litre " the tables of Weight and Capacity are obtained. Other units of weight used are the **Quintal** (= 100 Kg.) and the **Metric Ton** or **Tonne** (= 1,000 Kg.).

The tables of square measure and cubic measure are derived from that of length by squaring and cubing the numbers respectively. Thus 1 sq. Km = 1,000 × 1,000 sq. m., and 1 cub. m. = 100 × 100 × 100 cub. cm. In dealing with land, the units used are **Are** (= 100 sq. m.), **Hectare** (= 100 ares) and sq. Km. (= 100 hectares). The units cm., m., Km., g., Kg., quintal, and l. are those in common use. The Livre (= $\frac{1}{2}$ Kg.) is in common use in Belgium and the north of France.

The Metre was derived as being 1 ten-millionth part of the distance from the North Pole to the Equator. The Gram (or gramme) is defined as being the weight of 1 cub. cm. of distilled water at 4° C., and the Litre is a capacity of 1,000 cub. cm. Thus—

$$1 \text{ l. of water weighs } 1 \text{ Kg.}$$
$$1 \text{ cub. m.} = 1,000 \text{ l.}$$
$$1 \text{ l.} = 1 \text{ cub. dm.}$$

Many countries use the Metric System of Weights and Measures, but in some lands the units, although being the same, are designated by different names, particulars of which are given in Article 24.

NOTE 3.—The relationships between the units of the Imperial Systems and the corresponding units of the Metric System cannot be exactly expressed, but the approximate relationships are given in Article 25, which also deals with the problem of converting the expression of magnitudes of quantities from one system of units to the other.

III. Notation and Use of Brackets

(*a*) When a numerical quantity consists of numbers (or fractions) separated by +, −, × and ÷ signs, the value of the quantity is obtained by operating first with the × and ÷ signs and afterwards with the + and − signs.

(i) $\;5 - 4 \times 3 - 8 \div 2 + 21 \;= 5 - 12 - 4 + 21$
$$= 26 - 16 = 10$$

(ii) $\;\frac{2}{5} \times \frac{3}{4} + \frac{1}{10} \div 1\frac{2}{3} \;= \frac{2}{5} \times \frac{3}{4} + \frac{1}{10} \times \frac{3}{5}$
$$= \frac{3}{10} + \frac{3}{50} = \frac{18}{50} = \frac{9}{25}$$

(*b*) In most cases it is more convenient to denote division by placing the divisor below the dividend.

(i) $4 \times 5 \div 9 \times 9 \div 10 \quad = \dfrac{4 \times 5 \times 9}{9 \times 6 \times 10} = 3$

(ii) $1\frac{1}{3} \div 4 \times 4\frac{1}{2} \div 1\frac{4}{5} \quad = \dfrac{1\frac{1}{3} \times 4\frac{1}{2}}{4 \times 1\frac{4}{5}} = \dfrac{4 \times 5 \times 9 \times 5}{3 \times 4 \times 2 \times 9} = \dfrac{25}{6} = 4\frac{1}{6}$

(iii) $1\frac{1}{2} - \frac{2}{3} \div 1\frac{5}{12} \quad = \dfrac{1\frac{1}{2} - \frac{2}{3}}{1\frac{5}{12}} = \dfrac{18 - 8}{17} = \frac{10}{17}$

(*c*) A quantity in brackets is regarded as a single quantity, and thus the sign immediately before the bracket operates on it after its value is determined.

(i) $\;5 - (4 \times 3 - 8) \div 2 + 21 = 5 - 4 \div 2 + 21$
$$= 5 - 2 + 21 = 24$$

(ii) $\;(1\frac{3}{5} + \frac{2}{3}) \times (\frac{9}{17} - \frac{1}{6}) \quad = \dfrac{34}{15} \times \dfrac{37}{17 \times 6} = \frac{37}{45}$

(d) The values of certain complex fractions can readily be obtained by applying the principle that the value of a fraction is unaltered when the numerator and the denominator are multiplied by the same number.

(i) $(\frac{5}{8} + \frac{1}{6} - \frac{1}{4}) \div (\frac{2}{3} + \frac{5}{12}) = \frac{\frac{5}{8} + \frac{1}{6} - \frac{1}{4}}{\frac{2}{3} + \frac{5}{12}} = \frac{15 + 4 - 6}{16 + 10} = \frac{13}{26} = \frac{1}{2}$

(ii) $\dfrac{2\frac{2}{3} + \frac{3}{8} \times \frac{1}{4}}{3\frac{1}{4} - \frac{2}{8} \times \frac{1}{5}} = \dfrac{2\frac{2}{3} + \frac{3}{20}}{3\frac{1}{4} - \frac{2}{15}} = \dfrac{160 + 9}{195 - 8} = \dfrac{169}{187}$.

(e) If $a, b, c \ldots$ and x denote any numerical quantities, then
$$ax + bx - cx + \ldots = x(a + b - c + \ldots)$$

(i) $17 \times 73 + 26 \times 73 - 41 \times 73 = 73 \times (17 + 26 - 41)$
$$= 73 \times 2 = 146$$

(ii) $\dfrac{19 \times 7 \times 17}{55} + \dfrac{19 \times 7 \times 16}{55} = \dfrac{19 \times 7}{55} \times (17 + 16)$
$$= \dfrac{19 \times 7 \times 33}{55} = \dfrac{399}{5} = 79\frac{4}{5}$$

IV. Area of Rectangles and Volumes of Rectangular Prisms

(a) If the length of a rectangle be l units and the breadth b units, then the area is lb (i.e. $l \times b$) square units.

(b) If the length of a rectangular prism be l units, the breadth b units and the height h units, then the volume is lbh cubic units.

(i) An oblong field is 115 yd. 1 ft. 6 in. long and 53 yd. 1 ft. wide. Find the rental at £16 10s. per acre. If it be sold for £420, calculate the corresponding price per acre.

Area of field $= 115\frac{1}{2} \times 53\frac{1}{3}$ sq. yds.
$$= \frac{231 \times 160}{2 \times 3 \times 4{,}840} \text{ acres.}$$

Rental ,, $= £\dfrac{231 \times 160 \times 33}{2 \times 3 \times 4{,}840 \times 2}$
$$= £21$$

Cost of $\dfrac{231 \times 160}{6 \times 4{,}840}$ acres $= £420$

∴ ,, ,, 1 acre $= £\dfrac{420 \times 6 \times 4{,}840}{231 \times 160}$
$$= £330$$

(ii) Calculate the freight on 16 cases of goods, each case being 4 ft. 6 in. long, 3 ft. 8 in. wide, and 2 ft. 10 in. high, at 37s. 6d. per ton of 40 cub. ft.

Volume of each case $= 4\frac{1}{2} \times 3\frac{2}{3} \times 2\frac{5}{6}$ cub. ft.

Freight on 16 cases $= \dfrac{9 \times 11 \times 17 \times 16 \times 75}{2 \times 3 \times 6 \times 40 \times 2}$ shillings
$$= £35 \text{ 1s. 3d.}$$

V. Ratio, Proportion, Proportional Division, Percentage

A **Ratio** is a numerical quantity which compares the magnitudes of two similar quantities. The ratio of a to b is $a : b$ or $\dfrac{a}{b}$. When a quantity x is increased (or decreased) in the ratio $a : b$, the value becomes $x \times \dfrac{b}{a}$.

Given that two variable quantities are proportional to one another, and that a_1 and a_2 are values of the first corresponding to b_1 and b_2 of the second respectively, then $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2}$

If the quantities be inversely proportional then $\dfrac{a_1}{a_2} = \dfrac{b_2}{b_1}$

If a quantity x be divided into (i) two parts in the ratio $a : b$, the parts are $\dfrac{a}{a + b} \times x$ and $\dfrac{b}{a + b} \times x$ respectively : (ii) three parts in the rations $a : b : c$, the parts are $\dfrac{ax}{a + b + c}$, $\dfrac{bx}{a + b + c}$ and $\dfrac{cx}{a + b + c}$ respectively.

A **Percentage** is a ratio whose denominator (or consequent) is 100.

r per cent ($r\%$) of $x = \dfrac{rx}{100}$

A quantity a is $\dfrac{a}{b} \times 100$ per cent of a quantity b.

,, ,, ,, increased by r per cent becomes $a \times \dfrac{100 + r}{100}$

,, ,, ,, decreased by r per cent becomes $a \times \dfrac{100 - r}{100}$

(i) What ratio does the price £4 4s. per cwt. bear to the price $8\frac{3}{4}$d. per lb. ?

$£4\frac{1}{5}$ per cwt. is equivalent to $\dfrac{21 \times 240}{5 \times 112}$ pence per lb.

Ratio of $£4\frac{1}{5}$ per cwt. to $8\frac{3}{4}$d. per lb. is $\dfrac{21 \times 240 \times 4}{5 \times 112 \times 35} = \frac{36}{35}$

(ii) 17 yards of cloth cost £15 14s. 6d. Find the cost of 24 yards at the same price per yard.

Let $x \equiv$ cost of 24 yards of cloth, in shillings

$$\text{then } \frac{x}{314\frac{1}{2}} = \frac{24}{17}$$

$$\therefore x = \frac{629 \times 24}{2 \times 17} = 444$$

Ansr., £22 4s.

NOTE 4.—The number of yards is proportional to the number of shillings ; x and $314\frac{1}{2}$ shillings correspond to 24 and 17 yards respectively. Therefore, the ratio of x to $314\frac{1}{2}$ equals the ratio of 24 to 17. x is found by multiplying both ratios by $314\frac{1}{2}$. An alternate method is to increase $314\frac{1}{2}$ shillings in the ratio $17:24$.

(iii) A firm purchased 42 tons of coal at £2 14s. per ton. Later on the firm spent the same money in buying coal at £3 3s. per ton. How much coal was bought at the latter price ?

Let $x \equiv$ number of tons bought at 63s. per ton

$$\text{then } \frac{x}{42} = \frac{54}{63}$$

$$\therefore x = \frac{42 \times 54}{63} = 36$$

Ansr., 36 tons.

NOTE 5.—The total sum spent being the same, the number of tons bought is inversely proportional to the price per ton. Therefore, the ratio of x to 42 equals the inverse of the ratio 63 to 54. An alternate method is to decrease 42 tons in the ratio $63:54$.

(iv) Divide £815 among A, B and C in the ratios $2:3:5$.

A, B and C receive $\frac{2}{10}$, $\frac{3}{10}$, $\frac{5}{10}$, respectively of the total amount.

A receives $\frac{1}{5} \times 815 = £163$
and B ,, $\frac{3}{10} \times 815 = £244$ 10s.
,, C ,, $\frac{1}{2} \times 815 = £407$ 10s.

(v) (a) What is $8\frac{3}{4}\%$ of £220. (b) A man bought goods at £3 15s. per cwt. and sold them at $8\frac{1}{4}$d. per lb. What percentages of his outlay does he gain ?

(a) $8\frac{3}{4}\%$ of £220 $= £\frac{35 \times 220}{4 \times 100} = £19$ 5s.

(b) Percentage, selling price of cost price $= \frac{35 \times 112}{4 \times 75 \times 12} \times 100 = 108\frac{8}{9}$

$$\therefore \text{ Percentage gain } = 8\frac{8}{9}.$$

NOTE 6.—An alternate method is—

Ratio of S.P. to C.P. $= \frac{35 \times 112}{4 \times 75 \times 12} = \frac{49}{45}$.

$\therefore$ Percentage gain $= \frac{4}{45} \times 100 = 8\frac{8}{9}$.

(vi) By selling an article for £22 5s. 10d. a man gained 7 per cent. of his outlay ; for what should he have sold the article in order to have gained 12 per cent. ?

If the cost price be 100 units then the selling prices are 107 and 112 units respectively.

∴ The selling price to gain 12% is £22 5s. 10d. increased in the ratio 107 : 112.

$$\text{i.e. } 5{,}350 \times \tfrac{112}{107} \text{ pence} = £23 \text{ 6s. 8d.}$$

✓ (vii) A sells an article to B thereby gaining 15 per cent. profit ; B sells it to C and gains 10 per cent. profit ; C sells it to D thereby incurring a loss of 10 per cent. All profits and losses being based on cost prices, find by how much per cent. D's buying price is greater than A's cost price.

$$
\begin{aligned}
\text{Let } & \text{A's cost price} & = \ & 100 \text{ units.}\\
\text{Then } & \text{B's buying price} & = \ & 115 \text{ ,,}\\
\text{,, } & \text{C's ,,} \quad\quad\text{,,} & = \ & 115 \times \tfrac{110}{100} \text{ units}\\
\text{,, } & \text{D's ,,} \quad\quad\text{,,} & = \ & 115 \times \tfrac{110}{100} \times \tfrac{90}{100} \text{ units}\\
& & = \ & 113 \cdot 85
\end{aligned}
$$

Ansr., **13·85%**.

VI. Approximate Decimalization of Money by Inspection

On multiplying a number of shillings by 5, the value is expressed as a number of hundreds of £1 and this can at once be written down as a decimal of £1. Thus 8s. $= £\tfrac{40}{100} = £\cdot4$; 13s. $= £\cdot65$.

6d. $= £\cdot025$, 3d. $= £\cdot0125$, 9d. $= £\cdot0375$.

Suppose $\tfrac{1}{1000}$ of a £1 be called a mil,

$$\text{Then }
\begin{cases}
x \text{ farthings} = x \text{ mils. to nearest mil. when } x \text{ is less than 12.}\\
x \quad\quad\text{,,} \quad = x+1 \text{ ,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad x \text{ lies between 12 and 36}\\
x \quad\quad\text{,,} \quad = x+2 \text{ ,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad x \text{ ,,} \quad\quad\text{,,} \quad 36 \text{ and 48}
\end{cases}
$$

Thus 2¼d. $= £\cdot009$, 5½d. $= £\cdot023$, 11¼d. $= £\cdot047$, each being correct to three places of decimals.

(i) Express 8s. 7¼d., 11s. 9¾d. and 1s. 4¾d. as decimals of £1 correct to three places of decimals.

8s. 7¼d. $= £\cdot40 + £\cdot030 = £\cdot430$, 11s. 9¾d. $= £\cdot591$, 1s. 4¾d. $= £\cdot070$.

A decimal of £1 can be expressed in shillings and pence to the nearest farthing, by inspection, by the aid of the following rule—

$$
\begin{cases}
x \text{ mils} = x \text{ farthings to the nearest farthing when } x \text{ is 1, 2 } \ldots \ldots 12\\
x \quad\text{,,} \quad = x-1 \text{ ,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad x \text{ ,,} \quad 13, 14 \ldots 37\\
x \quad\text{,,} \quad = x-2 \text{ ,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad\quad\text{,,} \quad x \text{ ,,} \quad 38, 39 \ldots 49
\end{cases}
$$

Thus $£\cdot007 = 1¾$d., $£\cdot029 = 7$d., $£\cdot043 = 10¼$d., each being correct to the nearest farthing.

(ii) Express $£\cdot759$, $£\cdot345$, $£\cdot168$, $£\cdot5625$, $£\cdot9875$ in shillings and pence.

$$
\begin{aligned}
£\cdot759 &= £\cdot75 + £\cdot009 &= 15\text{s. } 2¼\text{d. (to nearest ¼d.).}\\
£\cdot345 &= £\cdot30 + £\cdot045 &= 6\text{s. } 10¾\text{d. ,, ,, ,,}\\
£\cdot168 &= £\cdot15 + £\cdot018 &= 3\text{s. } 4¼\text{d. ,, ,, ,,}\\
£\cdot5625 &= £\cdot55 + £\cdot0125 &= 11\text{s. } 3\text{d. (exactly).}\\
£\cdot9875 &= £\cdot95 + £\cdot0375 &= 19\text{s. } 9\text{d. ,,}
\end{aligned}
$$

NOTE 7.—Care must be taken as to when this method can be employed to give an accurate result. For example, to state that the cost of 100 articles at 11s. 8½d. each is $£\cdot585 \times 100$, i.e. £58 10s. is wrong, because $£\cdot585$ differs from 11s. 8½d. by an amount less than ½ farthing, but on being multiplied by 100, the error is increased 100 times. The rule can be used, however, if the problem is to multiply a sum of money by a quantity less than unity or to divide it by a quantity greater than unity.

(iii) Find the cost of 2·7345 oz. tr. of gold at £5 4s. 7d. per oz. tr.

Cost of 2 oz. tr. of gold $= £10$ 9s. 2d.
,, ,, ·7345 ,, ,, ,, $= £5·229 × ·7345$
$= £3·841$ correct to 3 places of dec.
$= £3$ 16s. 9¾d. (to nearest ¼d.)
∴ ,, ,, 2·7345 ,, ,, ,, $= £14$ 5s. 11¾d. (to nearest ¼d.).

(iv) Decrease £55 8s. 6d. in the ratio that £100 bears to £83 13s. 5d.

$$\text{Decreased amount} = £55·425 × \frac{83·671}{100}$$

$= £46·375$ correct to 3 places of dec.
$= £46$ 7s. 6d. (to nearest ¼d.).

(v) Find the cost of 7,000 articles at 13s. 9d. each.

Total cost $= £·6875 × 7,000$ (exactly)
$= £4812·5 = £4,812$ 10s.

(vi) What is 7% of £98 5s. 4d. ?

1% of £98·267 $= £·98267$
∴ 7% ,, $= £6·87869 = £6$ 17s. 7d. to nearest 1d.

VII. Interest

The **Simple Interest** (I units of money) on P units of money for n years at r per cent. per annum is given by the formula

$$I = \frac{P\,r\,n}{100}$$

In cases where a half-year's or a quarter's interest is required, the values of n substituted in the formula would be ½ or ¼ respectively.

In calculating the interest on money deposited in banks and on borrowed money, a daily basis is taken so that the formula becomes

$$I = \frac{P\,r\,n}{36500}$$

where n denotes the numbers of days. Thus the interest allowed by most banks on £100 at 5 per cent. per annum deposited for a complete leap year would be

$$£\frac{5 × 366}{365}$$

i.e. £5 0s. 3d. to the nearest penny.

(i) Calculate the interest on £89 11s. 2d. for the period 10th April to 5th July at 7 per cent. per annum.

$$\text{Interest} = £\frac{89·558 × 7 × 86}{36500}$$

$= £1$ 9s. 7d. to nearest 1d.

(ii) £500 was borrowed on 17th March; from 17th March to 31st March the interest charged was at the rate of 5 per cent. per annum ; from 31st March to 7th April, 5½ per cent. per annum ; from 7th April

to 12th April, 6 per cent. per annum. What sum should be paid on 12th April to clear the debt ?

$$\text{Total Interest} = \pounds\frac{500 \times 5 \times 14}{36500} + \pounds\frac{500 \times 5\frac{1}{2} \times 7}{36500} + \pounds\frac{500 \times 6 \times 5}{36500}$$

$$= \pounds\frac{500}{36500} \times [70 + 38\cdot5 + 30]$$

$$= \pounds\frac{138\cdot5}{73} = \pounds1 \text{ 17s. 11d. to nearest 1d.}$$

<p style="text-align:center">Ansr. £501 17s. 11d.</p>

When money is deposited on the understanding that each instalment of interest as it becomes due shall be added to the principal and thus bear interest for subsequent periods of time, then the difference between the initial sum of money and the amount after a number of years is called the **Compound Interest** on the former.

(iii) Find the compound interest on £573 17s. 9d. for two years at 6½ per cent. per annum, interest payable half-yearly.

	£
Principal, 1st half-year =	573·8875
Interest, ,, ,, = {	17·21662
	1·43472
Principal, 2nd ,, =	592·53884
Interest, ,, ,, = {	17·77617
	1·48135
Principal, 3rd ,, =	611·79636
Interest, ,, ,, = {	18·35389
	1·52949
Principal, 4th ,, =	631·67974
Interest, ,, ,, = {	18·95039
	1·57920
Amount after 2 years =	652·20933
Initial sum =	573·8875
∴Compound Interest =	£78·32183
=	£78 6s. 5d.

NOTE 8.—The working has been carried out to 5 places of decimals, in order that, allowing for " carrying figures," the final result shall be correct to 3 places of decimals and thus the interest calculated to the nearest penny.

(iv) What sum will amount to £240 in three years at 5 per cent. per annum, compound interest ?

By the method of the previous question it can be found that £100 amounts to £115·7625 in 3 years at 5 per cent. per annum.

∴. The sum required is £240 reduced in the ratio 115·7625 : 100.

$$\text{i.e. } \pounds\frac{240}{1\cdot157625} = \pounds207 \text{ 6s. 5d. to nearest 1d.}$$

VIII. Simple Equations and Applications

Inverse problems in Arithmetic are readily solved by the aid of simple equations. An equation is a statement that two qualities are equal in value.

It is obvious that if two quantities are known to be equal—

(1) The results, by adding the same quantity to each, will be equal.
(2) The results, by subtracting the same from each, will be equal.
(3) The results, by multiplying each by the same number, will be equal.
(4) The results, by dividing each by the same number, will be equal.

By applying these axioms in turn, any simple equation can be solved.

(i) Solve $\dfrac{x}{21} = \dfrac{18}{91}$

By multiplying both sides by 21, $x = \dfrac{18 \times 21}{91} = 4\frac{2}{13}$

(ii) Solve $2 \cdot 4x - 1 \cdot 7 = 1 \cdot 8x + 2 \cdot 8$

By adding $1 \cdot 7$ to and subtracting $1 \cdot 8x$ from both sides,
$$2 \cdot 4x - 1 \cdot 8x = 2 \cdot 8 + 1 \cdot 7$$
i.e. $\qquad \cdot 6x = 4 \cdot 5$
$$\therefore \quad x = 7 \cdot 5$$

Note 9.—Terms involving the unknown quantity are brought to one side of the equation and independent terms to the other. Axioms (1) and (2) are obeyed by changing the signs of the terms which are transposed.

(iii) $\dfrac{2x}{3} + \dfrac{x + 3}{4} = 2(5 - x)$

By multiplying both sides by 12,
$$8x + 3(x + 3) = 24(5 - x)$$
$$8x + 3x + 9 = 120 - 24x$$
$$\therefore \quad 8x + 3x + 24x = 120 - 9$$
i.e. $\quad 35x = 111$
$$\therefore \quad x = 3\frac{6}{35}$$

(iv) £328 is paid as wages to 72 men, some of whom receive £3 10s. each and the remainder £5 8s. each. How many men receive £3 10s. each ?

Let $n \equiv$ number of men who receive £3 10s. each.
Then $72 - n \equiv$,, ,, ,, ,, ,, £5 8s. ,,
$$\text{Then} \quad \frac{7n}{2} + \frac{27(72 - n)}{5} = 328$$
$$\therefore \quad 35n + 54(72 - n) = 3280$$
$$\therefore \quad 35n + 3888 - 54n = 3280$$
$$\therefore \quad 35n - 54n = 3280 - 3888$$
$$\therefore \quad -19n = -608$$
$$\therefore \quad n = 32.$$

Ansr. $\begin{cases} 32 \text{ men receive } £3 \text{ 10s. each} \\ 40 \text{ ,, ,, } £5 \text{ 8s. ,,} \end{cases}$

(v) 14s. was paid as interest on £121 13s. 4d. for 30 days. What rate per cent. per annum was charged ?

Let r = rate per cent. per annum.

$$\text{Then } \frac{7}{10} = \frac{121\frac{2}{3} \times 30 \times r}{36500}$$

$$\therefore \quad r = \frac{7 \times 36500 \times 3}{10 \times 365 \times 30}$$

$$= 7 \quad \text{Ansr. } 7 \text{ per cent. per annum.}$$

NOTE 10.—r is obtained by multiplying both sides by $\dfrac{36500}{121\frac{2}{3} \times 30}$

(vi) A merchant's list price of an article was 20 per cent. above his cost price. He sold the article to a customer at a discount of 5 per cent. and thereby gained £1 15s. What did the article cost him ?

Let $£x$ ≡ merchant's cost price

Then $£\dfrac{6x}{5}$ ≡   ,,   list   ,,

  ,, $£\dfrac{6x}{5} \times \dfrac{19}{20}$ ≡   ,,   selling ,,

$$\therefore \quad \frac{57x}{50} - x = 1\frac{3}{4}$$

$$\therefore \quad 114x - 100x = 175$$

$$\text{i.e.} \quad 14x = 175$$

$$\therefore \quad x = 12\frac{1}{2}$$

Ansr. £12 10s.

ARITHMETIC OF COMMERCE

CHAPTER I

SOLE TRADING AND PARTNERSHIP CONCERNS

1. A SOLE TRADER

is a person who has exclusive ownership of a business. He is legally responsible for all the debts and losses of the business, even if resulting from carelessness or dishonesty on the part of his employees. He can dispose of profits in accordance with his wishes, and as he is not compelled to have his accounts audited, it is left largely to his honesty to declare on his income tax returns the total of his gains during any financial year. Capital is introduced by him and the law does not prevent him from winding up or selling his concern at any time.

In most cases, businesses organized in this way are not extensive in character, for very often where great success has been attained, partners have been called in to supply capital : and later on the concern has been transferred into a company.

In order that the proprietor of a business may know his financial position at any time, it is necessary for him to keep accounts, and this, together with other problems of a kind which vary according to the nature of his business, render it imperative that he should possess a sound knowledge of Arithmetic.

EXAMPLE (i)—

A man, as manager of a concern, received a salary of £350 per annum, and he had £2,200, which yielded interest at the rate of 5 per cent. per annum. He resigned his appointment, withdrew his capital, borrowed £1,500 at 6½ per cent. per annum, and used the total sum of money in starting in business for himself. What would the annual profits have to be in order that he should not lose financially by his venture ?

Total income before starting the business	=	£350 + £110
	=	£460
Interest on borrowed capital	=	£15 × 6½
	=	£97 10s.
∴ Profits required annually	=	£557 10s.

EXAMPLE (ii)—

A trader paid £24 10s. per week as salaries to his employees, and the total of other expenses incurred in running his business amounted to £3 per week. His selling prices were 10 per cent. greater than the cost prices, and the average weekly takings were £385. He estimated that during the following year the cost prices would go up by 20 per cent., the salaries by 30 per cent., while the other expenses would remain the same. By what percentage should he increase his selling price so as to increase his net profits by 50 per cent., assuming that the quantity of goods bought and sold weekly would be the same as before ?

$\therefore$ Amount paid for goods, per week $= £385 \times \dfrac{10}{11}$ $= £350$

$\therefore$ Amount of net profits, per week $= £(35 - 27\frac{1}{2})$ $= £7.5$

$\therefore$ Increase of total outlay, per week $= £\left(70 + \dfrac{49}{2} \times \dfrac{3}{10}\right) = £77.35$

$\therefore$ Increase of takings, per week $= £(77.35 + 3.75)$ $= £81.1$

$\therefore$ Percentage increase of selling price $= \dfrac{81.1}{385} \times 100$

$= 21.1$

2. PARTNERSHIP

is defined as " the relation which subsists between persons carrying on business in common with a view to profit." The number of partners in a firm may consist of from two to twenty members, except in the case of a banking partnership, where the number must not exceed ten. Each of the partners must be competent to contract and any act on the part of one, such as engaging employees, buying goods, the giving of receipts, and, in fact, any transaction provided it comes within the ordinary course of business and lies within his powers according to the partnership agreement, is binding on the other partners, who are thus jointly responsible for any liabilities that may ensue. Whatever the name of the firm, the names of all the partners must appear in their business correspondence.

The contract of a partnership is, in general, an agreement in writing called the **Articles of Partnership,** which contains conditions relating to (1) duration of partnership; (2) amounts of capital subscribed; (3) interest on capital; (4) salaries; (5) sharing of profits and losses; (6) powers of the partners to make contracts binding to the firm; (7) dissolution of partnership and retirement of one or more partners; (8) goodwill. In cases of dispute, if

there be no articles of agreement, the **Partnership Act, 1890,** enacts that among other things—

1. Partners are entitled to share equally in the capital and profits, and must contribute equally to the losses, whether capital or otherwise.

2. Partners are entitled to receive interest at 5 per cent. per annum on any loans, apart from capital, made to the firm.

3. Partners are not entitled to be credited with interest on their capital, prior to the ascertainment of profits.

4. Partners are not entitled to any salary for acting in the partnership business.

By the **Limited Partnership Act, 1907,** a **Limited Partnership** must consist of one or two **general partners,** who shall be liable for all debts and obligations of the firm ; and one or more persons called **limited partners,** who have contributed capital but who are not liable for the debts and obligations of the firm beyond the amounts of the capital they have contributed.   Limited partners, as a rule, do not take an active part in the management of a firm, but they cannot withdraw or transfer their capital without the consent of the general partners.

EXAMPLE (iii)—

A firm consists of three partners : A's capital is £10,000, B's £8,000, and C's £6,000.   In addition, A has made a loan to the firm of £4,000.   During a certain trading period the profits, before paying interest on the loan, amounted to £5,300.   What should each receive under the following conditions : (1) There exists no agreement as regards the sharing of profits ; (2) by agreement, 5 per cent. interest is payable on capital and then profits shared equally ; (3) the parties are to receive $\frac{1}{2}$, $\frac{3}{10}$, and $\frac{1}{5}$ of the remaining profits respectively after interest has been paid on capital ?

(1) Interest on loan   = £200

   Amount of profits to be shared   = £5,100

   ∴ A, B, and C receive **£1,900, £1,700,** and **£1,700** respectively.

(2) Interest on A's capital   = £500

   ,,   B's   ,,   = £400

   ,,   C's   ,,   = £300

   Remaining amount to be shared   = £(5,100 − 1,200) = £3,900

   ∴ A, B, and C receive **£2,000, £1,700,** and **£1,600** respectively.

(3) A's share, in addition to interest = £1,950

   B's   ,,   ,,   ,,   = £1,170

   C's   ,,   ,,   ,,   = £780

   ∴ A, B, and C receive **£2,650, £1,570,** and **£1,080** respectively.

EXAMPLE (iv)—

At the beginning of a year the capitals of the two partners of a firm were £9,500 and £7,700 respectively. By their articles of agreement, profits were to be divided in proportion to capital. They were also enabled, subject to the consent of the other partner, to add or withdraw limited amounts of capital. After three months the first partner added £500 and the second withdrew £500, and after another five months the second added £400. At the end of the year the profits amounted to £3,845. What was the amount due to each partner ?

First partner's contribution of capital is equivalent to £28,500 + £90,000 for 1 month (i.e. £118,500 for 1 month).

Second partner's contribution of capital is equivalent to £23,100 + £36,000 + £30,400 for 1 month (i.e. £89,500 for 1 month). ⌣

$\therefore$ Amount due to first partner $= £\dfrac{1185}{2080} \times 3845$

$= £2,190$ 10s. 10d.

$\therefore$ Amount due to second partner $= £3,845 - £2,190$ 10s. 10d.

$= £1,654$ 9s. 2d.

EXAMPLE (v)—

Brown, Roberts, and Jones are in partnership, and by agreement their capital bears interest at 5 per cent. per annum, and withdrawals during the year are regarded as withdrawals of capital. They are not entitled to receive salary and profits are to be equally divided. At the beginning of 1919, their capitals were £12,000, £10,000, and £7,500 respectively. Brown withdrew £60 at the end of each month, Roberts withdrew £100 at the end of each period of 2 months, and Roberts withdrew £120 at the end of each quarter. During 1919, after payment of interest on capital had been made, the profits amounted to £2,754. In addition to the above withdrawals, each partner withdrew £100 of his share of profits and allowed the remainder, as well as interest, to augment his capital. Find the total incomes of the partners for the year 1919 and their capitals at the beginning of 1920.

Interest charged on Brown's withdrawals $= £60 \times \dfrac{1}{20} \times \dfrac{1}{12}(11 + 10 + \dots + 1)$

$= £\dfrac{60 \times 66}{20 \times 12} = £16\frac{1}{2}$

$\therefore$ Brown's income from interest on capital $= £600 - £16\frac{1}{2} = £583\frac{1}{2}$

$\therefore$ Brown's total income $= £\dfrac{2754}{3} + £583\frac{1}{2}$

$= £1,501$ 10s.

Roberts' income from interest on capital $= £500 - £\dfrac{100}{20 \times 6} \times \begin{pmatrix} 5 + 4 + 3 \\ + 2 + 1 \end{pmatrix}$

$= £487\frac{1}{2}$

$\therefore$ Roberts' total income $= £1,405$ 10s.

Jones's income from interest on capital $= £375 - £\dfrac{120}{20 \times 4} \times (3 + 2 + 1)$

$= £366$

$\therefore$ Jones's total income $= £1,284$

Brown's capital at the beginning of 1920 $= £12,000 + £1,501\frac{1}{2} - £720 - £100$

$= £12,681$ 10s.

Roberts's capital at the beginning of 1920 $= £10,000 + £1,405\frac{1}{2} - £600 - £100$

$= £10,705$ 10s.

Jones's capital at the beginning of 1920 $= £7,500 + £1,284 - £480 - £100$

$= £8,204$

EXAMPLE (vi)—

Referring to the previous example, if there had been a loss of £600 and the partners had made no additional withdrawals at the end of 1919, what would have been their incomes during 1919 and their capitals at the beginning of 1920, assuming the capital to be diminished to the extent of the loss ?

Brown's net income $= £583\frac{1}{2} - £200$

$= £383\frac{1}{2}$

Roberts's net income $= £287\frac{1}{2}$

Jones's net income $= £166$

Brown's capital at the beginning of 1920 $= £12,000 + £383\frac{1}{2} - £720$

$= £11,663$ 10s.

Roberts's capital at the beginning of 1920 $= £10,000 + £287\frac{1}{2} - £600$

$= £9,687$ 10s.

Jones's capital at the beginning of 1920 $= £7,500 + £166 - £480$

$= £7,186$

3. DRAWINGS ACCOUNTS.

In a large number of firms the capital of each partner is kept at its original figure. Whether a partner is in receipt of salary or not, it does not follow that he will have to wait until the end of a trading period before drawing upon his share of the profits or interest on capital (if any). To enable partners to be able to withdraw sums of money at their convenience, each has a **drawings account** on which interest (if any) on capital and share of profits are entered on **Cr.** side and withdrawals on **Dr.** side. The balance on the Drawings Account is not usually transferred to the Capital Account at the end of each trading period, but is regarded more in the nature of a loan to the firm in the case of a favourable balance, or as a loan by the firm to a partner in the case of an adverse balance. Interest would be allowed on a surplus in the account or charged against a deficit at a rate in accordance with the Articles of Agreement.

EXAMPLE (vii)—

Taylor and Kerr are in partnership with fixed capitals of £8,000 and £6,000 respectively. By agreement : (1) interest at 4½ per cent. per annum on capital is payable at the end of the year ; (2) interest at 5 per cent. per annum is allowed on the surplus in their drawings accounts and charged against a deficit therein ; (3) profits and losses after the above have been paid are divided equally. At the beginning of 1919, Taylor had a surplus of £450 in his Drawings Account, and Kerr a deficit of £300. During 1919, Taylor withdrew the following sums : March 20th, £200 ; June 23rd, £250 ; October 25th, £300 ; and Kerr withdrew £300 on May 15th and £400 on September 20th.

The profits available for division at the end of the year amounted to £1,760 ; what were the amounts standing to their credit in their respective Drawing Accounts at the beginning of 1920 ?

Interest on £200 from 20th Mar. to 31st Dec. at 5% per an. $= £\dfrac{200 \times 5 \times 286}{36500}$

$$= £7 \text{ 16s. } 9d.$$

,,	£250	,,	23rd June	,,	,,	,,	= £6 10s. 10d.
,,	£300	,,	25th Oct.	,,	,,	,,	= £2 15s. 1d.
,,	£300	,,	15th May	,,	,,	,,	= £9 9s. 0d.
,,	£400	,,	20th Sept.	,,	,,	,,	= £5 11s. 9d.

Dr.   TAYLOR'S DRAWINGS ACCOUNT.   Cr.

1919.		£	s.	d.	1919.		£	s.	d.
Mar. 20	To Cash . . .	200	–	–	Jan. 1	By Balance . .	450	–	–
June 23	,, ,, . . .	250	–	–	Dec. 31	,, Interest on Surplus	22	10	–
Oct. 25	,, ,, . . .	300	–	–	,,	,, Interest on Capital	360	–	–
Dec. 31	,, Interest on Withdrawal:				,,	,, Share of Profits .	880	–	–
	March 20 . .	7	16	9					
	June 23 . .	6	10	10					
	Oct. 25 . .	2	15	1					
Dec. 31	,, Balance c/d . .	945	7	4					
		1,712	10	–			1,712	10	–
					1920.				
					Jan. 1	By Balance b/d . .	945	7	4

Dr.   KERR'S DRAWINGS ACCOUNT.   Cr.

1919.		£	s.	d.	1919.		£	s.	d.
Jan. 1	To Balance . . .	300	–	–	Dec. 31	By Interest on Capital .	270	–	–
May 15	,, Cash . . .	300	–	–	,,	,, Share of Profits .	880	–	–
Sept. 20	,, ,, . . .	400	–	–					
Dec. 31	,, Interest on Deficit	15	–	–					
,,	,, Interest on Withdrawal:	9	9	–					
	May 15 . .								
	Sept. 20 . .	5	11	9					
,,	,, Balance c/d . .	119	19	3					
		1,150	–	–			1,150	–	–
					1920.				
					Jan. 1	By Balance b/d . .	119	19	3

4. GOODWILL.

It frequently happens that, when a business changes hands, former customers continue to have commercial relationships with

the concern under its new proprietorship. As a result, the new owner makes greater profits than he would have obtained had he started an entirely new concern, for in this case considerable time would elapse before he could create a connection which would give him a good return on the capital he had invested. Thus, a business having already a good connection is worth a considerable amount, in addition to the value of premises, appliances, stock, etc. This asset of a business due to its connection is known as **Goodwill,** the value of which is usually reckoned as being worth the amount of the profits obtained during the last two to five years.

When a new partner enters a firm, as he will share in the goodwill of the business, he will, besides subscribing capital, make a payment to the old partners for allowing him to share with them the goodwill of the concern. This payment may be made directly in two ways : (1) by the old partners accepting cash to be used for purposes independent of the firm if they wish ; (2) by the money being divided among the old partners in any agreed ratios with the understanding that the amounts be added to their respective capitals in the firm. Two indirect methods of paying for goodwill are sometimes applied : (1) by the share of the profits allocated to the new partner being lower, relative to capital, than that received by the old partners ; (2) by nominally increasing the capitals of the old partners and allowing for this by a corresponding increase of the goodwill asset of the firm.

EXAMPLE (viii)—

The net profits of a business during four consecutive years were £425, £385, £365, and £340 respectively. The owner then engaged a new manager, whom he allowed, in addition to salary, 15 per cent. of the net profits. The profits during the next four years were £384, £415, £482, and £594 respectively. Find the additional gain to the owner at the end of this period, due to the change in managership, reckoning goodwill at four years' purchase.

Total profits during first period of four years	$= £1,515$
Owner's share of profits during second period of four years	$= £1,875 \times \dfrac{85}{100}$
	$= £1,593$ 15s.
Owner's increase of profits	$= £78$ 15s.
Increase of goodwill	$= £(1875 - 1515)$
	$= £360$
∴ Additional gain to owner	$= £438$ 15s.

EXAMPLE (ix)—

The total capital of a partnership is £12,000 and profits are divided in proportion to capital. The average yearly profits during the last five years amounted to 12½ per cent. of the capital. A new partner comes into the business and puts in £4,000 capital, in addition to paying a sum of money in respect of goodwill, reckoned at five years' purchase. What should be the amount of the latter payment if it be used by the old partners for purposes independent of the firm ? Also, if the profits next year were to be 12 per cent. of the capital, what percentage would the new partner's share be of the total money paid by him ?

Value of goodwill	$= £\dfrac{12,000}{8} \times 5 = £7,500$
New partner's share of the business	$= \dfrac{4}{4 + 12} = \frac{1}{4}$
∴ Payment in respect of goodwill	$= £7,500 \times \frac{1}{4} = £\mathbf{1,875}$
New partner's share of profits, next year	$= £16,000 \times \dfrac{12}{100} \times \frac{1}{4}$
	$= £480$
New partner's percentage return	$= \dfrac{480}{5875} \times 100$
	$= 8\dfrac{8}{47}.$

EXERCISE (x)—

A and B were in partnership with capitals of £5,500 and £3,500. C then joined them, putting in £2,500 capital and paying in respect of goodwill £900, which was divided between A and B in proportion to their capitals and added on to their former capitals. Previous to C's joining the firm, the profits amounted to an average of £1,120 annually, but afterwards the average was £1,500. Assuming that profits were shared in proportion to capital, find the annual increase in the share of profits received by B.

B's yearly share of profits before C joined the firm	$= £1,120 \times \dfrac{35}{90}$
	$= £435$ 11s. 1d.
B's capital after C joined the firm	$= £3,500 + £350$
	$= £3,850$
B's yearly share of profits after C joined the firm	$= £1,500 \times \dfrac{3850}{12400}$
	$= £465$ 14s. 6d.
∴ B's yearly increase of profits after C joined the firm	$= £\mathbf{30}$ **3s. 5d.**

EXERCISE (xi)—

Harvey and Cook had capitals of £15,000 and £13,000 in a firm, and after paying interest at 5 per cent. per annum on capital, they shared the remaining profits equally. At the end of 1919, the firm's profit, before deducting interest on capital, was 15 per cent. of the total capital. At the beginning of 1920, Locke entered the firm, added £8,000 capital, but made no payment for goodwill. The asset " goodwill " was increased by £1,400, and to make a balance the capitals of Harvey and Cook were nominally increased by £750 and £650 respectively. It was agreed that Locke should have ⅕ of the profits

available for division, the remainder being equally divided between Harvey and Cook. At the end of 1920 the profit, before paying interest on capital, was again 15 per cent. of the total capital.

Find (1) by how much Harvey's and Cook's incomes during 1920 were greater or less than those in 1919, and (2) the amount of Locke's income in 1920.

(1) Profit in 1919, after deducting interest on capital $= £\frac{1}{10} \times 28,000 = £2,800$

Harvey's income during 1919 $= £750 + £1,400 = £2,150$

Cook's income during 1919 $= £650 + £1,400 = £2,050$

Total capital during 1920 $= £37,400$

Profit in 1920, after deducting interest on capital $= £3,740$

Harvey's income during 1920 $= £787\frac{1}{2} + £\frac{2}{5} \times 3,740$

          $= £2,283$ 10s.

Cook's income during 1920 $= £682\frac{1}{2} \times £\frac{2}{5} \times 3,740$

          $= £2,178$ 10s.

∴ Harvey's and Cook's incomes are increased by £133 10s. and £128 10s. respectively.

(2) Locke's income during 1920 $= £400 + £\frac{1}{5} \times 3,740$

          $= £1,148$

TEST EXERCISES 1.

(1) A man put in a business £4,750, of which £2,000 was borrowed at 6 per cent. per annum. During a certain year, the profits of the business amounted to £850. Find his income for the year and calculate the percentage with respect to the unborrowed capital.

(2) A man in receipt of a salary of £300 per annum had £1,200 bearing interest at 5 per cent. per annum. He resigns his appointment, withdraws his capital, and uses it to start a business for himself. What profit per annum should he obtain in order that he should increase his income by 20 per cent. ?

(3) A trader paid altogether £9 7s. 6d. per week as salaries to his employees and gained for himself an average of £8 10s. per week. The average weekly payment for goods was £52 8s., and the average weekly sales amounted to £74 10s. Assuming that the cost price of commodities purchased by him increased 20 per cent., that he increased the wages of his employees by 15 per cent., that other expenses remained the same, and that he bought and sold the same quantity of commodities as formerly, by what per cent. must he increase his selling prices in order that he should gain £10 per week for himself ?

(4) A retailer sold his goods at prices which were 25 per cent. greater than cost prices. If the latter be increased by 20 per cent. and he spend the same total amount per week in purchasing goods as formerly, calculate the percentage increase of gross profits if he increase his selling prices by 25 per cent.

(5) A manufacturer employed a number of men, each of whom formerly worked 48 hours per week for a wage of £2 16s. per week. Later on, he paid each man £4 4s. per week for doing 44 hours' work. Calculate the percentage increase of each man's wage per hour.

(6) Formerly, the proprietor of a business gained £4,200 per annum and paid Income Tax at 1s. 2d. in the £. Later on, his gain in excess of £4,400

was taxed 80 per cent., and he also paid Income Tax at 6s. in the £ on £4,400, and on the 20 per cent. of excess profits. What was the amount gained by his business, given that after paying Income Tax he was left with 50 per cent. more than before ?

(7) An agent received a fixed salary and a commission at a fixed rate per cent. of the amount of his sales. During two years the sales amounted to £12,400 and £15,700, and the total salaries received were £386 and £435 10s. respectively. What must be the yearly amount of the sales effected by him in order that his salary should amount to £600 per annum ?

(8) A merchant frequently borrows sums of money not exceeding £1,000 for periods of time not exceeding 3 months. Construct a table giving the interest on £1 for 1 day at 5, 5¼, 5½, 5¾, 6, and 6½ per cent. per annum by means of which the interest on the loans can be calculated to the nearest penny. Use the table to find the interest on £470 for 30 days at 5½ per cent. per annum, and on £600 for 17 days at 6 per cent. per annum.

(9) 1 lb. of a certain commodity occupies 63½ c. in. It is required to make cylindrical tins capable of containing ¼ lb. of the powder. If the diameter of the tins be 3 in., calculate the least height, expressed in inches and eighths of an inch. [Vol. of cylinder = ·7854 × (diam.) ² × (ht.)]

(10) The capitals of three partners are £6,000, £4,400, and £2,800 respectively. They divide profits so that, after each has received up to 5 per cent. of his capital, the remainder, if any, is shared equally. What is each partner's total share when the year's profits amount to (1) £440, (2) £1,720 ?

(11) A firm consists of four partners, Shaw, Brown, Ross, and Harvey, whose capitals are £12,000, £3,500, £2,500, and £2,000, and Brown has made a loan to the firm of £5,000. By the articles of partnership, the rate of interest on loans is at 6 per cent. per annum, Shaw is entitled to receive £500 out of the profits, one half the remainder is divided in proportion to capital, and the residue divided equally between the partners. Calculate the amount each are entitled to receive when the profits before interest on the loan is made amount to (1) £1,200, (2) £4,800.

(12) A partner in a firm is entitled to £40 per month, interest on his capital of £7,145 at 5 per cent. per annum, and ⅓ of the total remaining profits after the salaries of the partners and interest on capital have been paid. What was his income during a year when the profits after salaries and interest on capital had been paid amounted to £1,740 ?

(13) The income of another partner of the firm of the previous question amounts altogether to £918. His salary is £30 a month, and he is entitled to ⅓ of the remaining profits. What was his capital ?

(14) A man had £4,250 capital in a firm, and he also had made a loan of £3,000 to the firm. He received 4 per cent. interest on his capital and 6 per cent. on the loan. His share of the profits during a certain year amount to £635. What percentage of the total amount he had invested in the firm was the total he received ?

(15) Saunders, Naylor, and Timms agreed to divide the profits of their firm in proportion to their capitals, which, at the beginning of 1921, were £5,200, £3,600, and £3,200 respectively. After 2 months, Saunders and Timms withdrew £800 and £200 respectively ; after another 4 months, Saunders and Naylor added £400 and £500 respectively, and after another 3 months Timms withdrew £200. Their profit at the end of the year amounted to £2,082. What were their respective shares ?

(16) The capitals of the three partners comprising a firm were £2,500, £2,100, and £1,800 at the beginning of a certain year. The profits amounted to 15 per cent. of the capital, and were divided such that, after interest at 6 per cent. per annum was paid on capital, the remainder was divided equally. What percentages were the shares of the partners of their respective capitals ?

(17) X, Y, and Z, having capitals of £15,000, £6,000, and £2,500 respectively

in their firm, agree to allow interest at 5 per cent. on their capital, and to share the balance of the profits in the ratios 5 : 3 : 2.   At the end of the year, after allowing for interest on capital, there was a loss of £1,360.   What is the net amount received by X, and what amounts should Y and Z respectively pay into the firm in order that their capitals during the next year should be the same as before ?

(18) Harris & Co. is a limited partnership having a total capital of £20,000, of which £12,000 has been subscribed by Harris, the general partner.   Ray and Salter are two of the limited partners : the former has £1,500 capital and the latter £800 capital in the firm.   Harris's, Ray's, and Salter's shares of the profits and losses are ½, ⅛, and ⅛ respectively.   There is a loss on the year's working amounting to £8,220.   What are Harris's, Ray's and Salter's shares of the loss, assuming the capitals of each of the other limited partners are greater than their respective shares of the loss ?   (*N.B.*—Losses should be divided betwen Harris, other partners, Ray and Salter, in the ratios 12 : 5 : 4 : 3, but Salter's loss cannot exceed his capital, as he is a limited partner.   After Salter's contribution to the loss has been allowed for, the remaining loss must be borne by the others in the ratios 12 : 5 : 4.)

(19) Rogers and Maine were in partnership, their capitals at the beginning of 1918 being £8,250 and £6,750 respectively.   They agreed to allow interest at 5 per cent. on capital, and to equally divide the remainder of the profits. At the end of each year the balances in their respective Drawings Accounts were transferred to their Capital Accounts.   During 1918 and 1919 they withdrew £40 and £35 at the end of each month respectively, and the profits before paying interest on capital amounted to £1,500 and £1,940 respectively. What were their respective capitals at the beginning of 1920 ?

(20) Referring to the previous question, what would have been the capitals of Rogers and Maine at the beginning of 1920 had there been, before paying interest on capital, a loss of £100 during 1918 and a gain of £1,200 during 1919 ?

(21) Bourne and Tucker subscribed £10,000 and £2,000 to their firm, of which they were the only partners.   Tucker also made a loan of £5,000 to the firm.   There was no agreement concerning division of profits.   Prior to allowing any interest which may be due to either partner, the profits during a trading period amounted to £1,325.   How much of this could legally be claimed by Tucker ?

(22) Thompson, Ford, and Lowe are in partnership with fixed capitals of £4,500, £2,900, and £2,600 respectively.   Profits are divided such that, after interest at 5 per cent. per annum on capital and interest at 4 per cent. on Drawings Account balance, each payable half-yearly, have been allowed for, the net profits are divided in the ratios 5 : 3 : 2.   On 1st January, 1919, they had favourable balances in their Drawings Accounts of £451 13s. 2d., £312 10s. 6d., and £179 11s. 10d. respectively.   They withdrew £50, £40, and £35 respectively at the end of each month.   The profits, after deducting payments as interest, amounted to £645 on 30th June, 1919, and £732 on 31st December, 1919.   Make out their Drawings Accounts, giving the balance in each case on 1st January, 1920.

(23) Clarke was a partner in a firm to which he had subscribed £4,000 as fixed capital.   He was entitled to interest at 5 per cent. per annum, both on his capital and on money in his Drawings Account.   At the beginning of 1918 his Drawings Account was overdrawn to the extent of £85 14s. 4d. He withdrew £40 on 23rd April, £42 on 20th August and £45 on 28th October. On 31st December, in addition to interest, £405, being his share of net profits, was paid into his Drawings Account.   Make out his Drawings Account and determine the balance at the beginning of 1919.

(24) Davies and Brooks are in partnership with capitals of £5,000 and £4,000 respectively, and profits are divided in proportion to capital.   White now comes into the firm and subscribes £3,000 capital.   Reckoning the

goodwill of the business to be worth £6,000, what sums of money should White pay to Davies and to Brooks ?

(25) Referring to the previous questions, the average yearly profits of the firm before White came amounted to £972 and afterwards to £1,302, and both Davies and Brooks invested the money received from White in stock yielding 5¾ per cent. per annum. What changes in their respective incomes were brought about by White's entry into the firm ?

(26) A and B had capitals of £3,750 and £3,250 respectively in their firm when they were joined by C, who subscribed £2,000 capital and £1,400 in respect of goodwill, the latter sum being used to increase the capitals of A and B in the same ratio. During the year before C's entry the profits amounted to £1,043 and was divided in proportion to capital. After C came, the profits amounted to £1,365 and was again divided between the three partners in proportion to capital. What was C's share and what were the respective changes in A's and B's incomes due to C becoming a partner ?

(27) Crump and Page, in partnership with capitals of £8,400 and £6,600 respectively, received 5 per cent. per annum interest on capital and equal shares of the remaining profits. They were joined by Alford, who brought in £5,000 capital. It was agreed that the latter should make no payment in respect of goodwill but that the capitals of Crump and Page should be each increased by 12½ per cent. and allowance made for this on the balance sheet by increasing the goodwill asset by the necessary amount. It was also agreed that capital should bear interest at 6 per cent. per annum and remaining profits divided equally. Before Alford joined the firm, the profits, before interest on capital was paid, were 12 per cent. of the firm's capital, and afterwards, 10½ per cent. of the increased capital. What were the respective incomes of the partners both before and after Alford joined the firm ?

(28) A, B, and C were in partnership during 1919 with capitals of £8,800, £7,500, and £6,200 respectively and profits were shared in the ratios 10 : 8 : 7. At the beginning of 1920 X joined the firm with £5,500 capital, but made no payment in respect of goodwill. It was agreed that profits should be divided in the ratios 10 : 8 : 7 : 3. The profits during 1919 amounted to £5,400, and during 1920 were such that X's share was 12 per cent. of the capital he had subscribed. What were A's, B's, and C's shares of profits respectively during 1919 and during 1920 ?

CHAPTER II

5. A JOINT STOCK COMPANY

is an association of individuals united for the purpose of engaging in business or in any undertaking. An **Incorporated Company** is regarded legally as an individual, and the members have no separate liability to the creditors of the company.

The liability of a member or shareholder in a **Limited Company** is limited to the amount of the shares for which he has subscribed or accepted responsibility. In the case of a **Public Limited Company,** shares are issued to the public, and are transferable; audit of accounts is compulsory, and a balance sheet must be prepared annually and filed at the Companies Registration Office.

6. FORMATION OF A COMPANY.

In order to form a company, the promoters lodge the **Memorandum of Association** and the **Articles of Association** (if any) with the Registrar of Joint Stock Companies, and, if in order and when legal fees and stamp duties are paid, the latter will issue a **Certificate of Incorporation.** The Memorandum of Association declares the objects and defines the powers of the company, and the Articles of Association gives particulars concerning the rules, regulations, and by-laws under which the internal workings of the company are to be governed.

7. KINDS OF CAPITAL.

The **Authorized Capital** (or Nominal or Registered Capital) of a company is the maximum amount the directors have legal power to raise. **Issued Capital** is the amount offered and subscribed for; while **Unissued Capital** is that which the directors have power to issue at a later date. **Called-up Capital** is that part of the issued capital for which the directors have sent calls, and **Paid-up Capital** is that received by the company in response to the call. **Working Capital** is the amount of paid-up capital plus debentures (if any)

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available for carrying on business, after preliminary expenses and purchase price have been paid.

Stock represents fully paid-up shares which have been converted, and can be subdivided into fractional amounts, whereas **Shares,** which may or may not be fully paid-up, are numbered distinctively, are each of some definite amount, and cannot be split up.

8. KINDS OF SHARES.

Preference Shares give a preferential right, either to a fixed rate of dividend or to a return of capital, or both. If the shares be **cumulative,** and during a period of time the dividend stated on the prospectus cannot be paid in full, then, in subsequent years, profits must be used to pay the accumulated dividends before dividends on other shares can be payable. If **non-cumulative,** no unpaid arrears can be carried forward.

Ordinary Shares entitle their owners to an unlimited or limited (according to the Articles of Association) proportional part of the profits after prior charges and dividends on preference shares have been paid.

Deferred Shares entitle their owners to dividend either after other shareholders have received a stated dividend or after the expiration of a certain period of time.

Founders' or Management Shares are sometimes held by the promoters and enable them to receive a certain fraction of the profits after the other shareholders have received dividends in accordance with the Articles of Association.

Participating Preference Shares entitle their holders to receive additional dividends after the holders of ordinary shares and deferred shares (if any) have received a certain percentage, and the holders of **Participating Ordinary Shares** can, if profits permit, receive additional dividends after the owners of deferred shares have received a given percentage.

Companies can obtain loans by the issue of **Debenture Stock,** interest on which is payable on certain dates (usually half-yearly) at a specified rate. Whether there be any profits or not, the interest on debentures must be paid as long as there are assets out of which to pay it, whereas dividend on shares is only payable if profits permit. A holder of **Mortgage Debenture** has security

for the repayment of the loan. **Redeemable Debentures** provide for repayments at a given date or upon notice, whereas **Irredeemable Debentures** are issued on condition that repayments will be made only on default of paying the interest stated, or on the winding-up of the company.

9. ISSUE OF SHARES AND STOCK.

Invitation to the public to subscribe to a company is made by a prospectus, attached to which is a form of application. Persons desirous of taking up shares fill up the forms and forward them, together with the application money, to the company. Those whose applications are successful receive from the company letters stating the number of shares allotted and requesting the money due on allotment. At specified dates, the directors can make a call for further subscriptions until the shares are fully paid. It sometimes happens that the directors have sufficient capital without making a final call, in which case the shares may be left not fully paid up for many years. Any person who has transferred to him shares which are not fully paid is liable for completion of payment on receiving a call.

When dividend at a given rate is payable on shares not fully paid up, the amount per share is that percentage of the money that has been paid up on each share. For example, a dividend of 25 per cent. on £1 shares on which 18s. has been paid would entitle a shareholder to receive 4s. 6d. per share.

An applicant for shares is frequently allowed only a fraction of the number asked for. In this case, the company would retain the money sent on application and use it to discharge payments on allotment and future calls. Of course, if the amount sent on application be greater than the total value of the shares allotted, the difference would be at once refunded to the applicant. Interest is allowed to shareholders who make their subscriptions before, and charged to those who subscribe after, the stated dates of the calls. A shareholder, in the event of non-payment within a reasonable time of receiving a call, would, after warning, have to forfeit his shares, which may be re-issued by the directors at a discount.

Shares and debentures may be issued at par, at a premium, or (in the case of debentures only) at a discount. Debentures may be

issued at par and redeemable at a premium, or issued at a discount and redeemable at par.

Income Tax, in the case of dividends, is deducted at the source, so that shareholders would receive their shares of the profits less Income Tax at the rate for unearned incomes.   In the case where this rate is higher than that in accordance with the total income of a shareholder, the latter can obtain the difference from the Inland Revenue Commissioners. It frequently happens that a company declares a rate of dividend free from Income Tax, which means that after Income Tax on the company's profits has been paid, sufficient remains to pay dividend at the declared rate.

EXAMPLE (i)—

The nominal capital of a company consisted of £400,000, made up of 10,000 preference shares of £10 each and 300,000 ordinary shares of £1 each. All the preference shares were subscribed for and fully paid, but only 200,000 ordinary shares were allotted, and the amount paid up on each was 17s. 6d. Preliminary expenses and necessary purchases altogether amounted to £120,000.   What was the issued capital, the called-up capital, the paid-up capital, and the working capital respectively ?

Issued Capital	= £100,000 + £200,000	= **£300,000**
Called-up Capital	= £100,000 + £$\frac{7}{8}$ × 200,000	= **£275,000**
Paid-up Capital	= **£275,000**	
Working Capital	= £275,000 – £120,000	= **£155,000**

EXAMPLE (ii)—

Referring to the above question, if all the ordinary shares had been subscribed for and fully paid up, and if £50,000 debenture stock had been issued at 102 per cent., what would have been the working capital ?

| Paid-up Capital | = £400,000 + £500 × 102 | = £451,000 |
| Working Capital | = £451,000 – £120,000 | = **£331,000** |

EXAMPLE (iii)—

During February, 1921, a certain company offered £350,000 debenture stock at 95 per cent., carrying interest at 5 per cent. free of Income Tax up to 6s. in the £ and 400,000 6 per cent. (free of Income Tax up to 6s. in the £) Cumulative Preference shares of £1 each at par.   Interest on the former and dividend on the latter were payable on 1st January and 1st July in each year, first payments in each case being made on 1st July, 1921, and calculated on the instalments as from their due date of payment. Subscriptions were payable as follows—

		Debenture Stock	Preference Shares
1921.			
Feb. 23rd	On Application	10 per cent.	2s. 6d.
Feb. 25th	On Allotment	40 ,,	7s. 6d.
Mar. 13th		45 ,,	10s. 0d.

(1) Assuming all stock and shares were allotted and all payments made when due, calculate the amounts received by the company on each date.

(2) Calculate the payments to be made on the stock and on the shares on 1st July, 1921.

(3) Calculate the actual yield per £100 cash in each case.

(1) Amount received for Debenture Stock on 23rd Feb., 1921 = £35,000

,, ,, Preference Shares ,, ,, ,, = £50,000

∴ Total amount received ,, ,, ,, = **£85,000**

Total amount received on 25th Feb., 1921 = £140,000 + £150,000

= **£290,000**

Total amount received on 13th March, 1921 = £$\frac{9}{20}$ × 350,000 + £200,000

= **£357,500**

(2) Interest due 1st July, 1921, on Debenture Stock

$$= \text{£}\frac{350 \times 5 \times 128}{365} + \text{£}\frac{1,400 \times 5 \times 126}{365} + \text{£}\frac{1,575 \times 5 \times 110}{365}$$

$$= \text{£}\frac{5}{365} \times (44,800 + 176,400 + 173,250)$$

$$= \text{£}\frac{5 \times 394,450}{365} = \text{£5,403 8s. 6d.}$$

Dividend, due 1st July, 1921, on Preference Shares

$$= \text{£}\frac{500 \times 6 \times 128}{365} + \text{£}\frac{1,500 \times 6 \times 126}{365} + \text{£}\frac{2,000 \times 6 \times 110}{365}$$

$$= \text{£}\frac{6}{365} \times (64,000 + 189,000 + 220,000)$$

$$= \text{£}\frac{6 \times 473,000}{365} = \text{£7,775 6s. 10d.}$$

(3) Interest, free of Income Tax, is $\frac{7}{10}$ of that before Income Tax is deducted.

∴ Interest on £95 cash = £5 × $\frac{10}{7}$

∴ ,, £100 ,, = £$\frac{5 \times 10 \times 100}{7 \times 95}$ = **£7 10s. 4½d.**

Dividend on £100 cash = £6 × $\frac{10}{7}$ = **£8 11s. 5d.**

EXAMPLE (iv)—

The Debenture Stock referred to in the previous example is redeemable at 102½ per cent. by annual drawings or purchase at the end of each year up to 1940, commencing on 31st December, 1921. What was the total amount received, free of Income Tax, by a man who took up £100 Debenture Stock which was redeemed at the end of 1921, the man's total income being such that Income Tax at 3s. in the £ was payable?

Dividend due on 1st July, 1921 = $\frac{1}{3500}$ of £5,403 8s. 6d.

= £1 10s. 11d.

Dividend due on 1st January, 1922 = £2 10s. 0d.

He receives $\dfrac{14}{20}$ of that due to him before Income Tax is deducted, but he should receive $\dfrac{17}{20}$ of the latter amount.

$\therefore$ Amount claimed from Inland Revenue Commissioners $= \dfrac{3}{14}$ of £4 0s. 11d.

$= $ 17s. 4d.

Gain by redemption of stock at 102½, less Income Tax $= £\dfrac{17}{20} \times 7\frac{1}{2}$

$= $ £6 7s. 6d.

$\therefore$ Total amount received, free of Income Tax $= $ £11 5s. 9d.

EXAMPLE (v)—

Referring to Example (ii), a man made application for 1,000 preference shares, but was only allotted 200. What should he pay on 13th March if interest at 6 per cent. per annum, reckoned from 25th February, be allowed on payments paid before the due date?

Amount forwarded on application $= $ £125

Excess of due payment from 25th Feb. to 13th March $= $ £25

Interest allowed on excess $= £\dfrac{25 \times 6 \times 16}{36,500}$

$= $ 1s. 4d.

$\therefore$ Amount forwarded on 13th March $= $ £75 – 1s. 4d.

$= $ £74 18s. 8d.

EXAMPLE (vi)—

A man held 1,320 shares of £1 each on which 18s. was paid up. A half-yearly dividend of 6 per cent. per annum was declared. What sum did the man receive from the company, Income Tax at 6s. in the £ having been deducted?

Amount received $= £\dfrac{9}{10} \times 1,320 \times \dfrac{3}{100} \times \dfrac{7}{10}$

$= $ £24 19s.

EXAMPLE (vii)—

The paid-up capital of a company consisted of £300,000 Debenture Stock carrying interest at 5 per cent. per annum, 50,000 6 per cent. Preference Shares of £5 each, and 600,000 ordinary shares of £1 each. The profits available for distribution among the holders of debenture stock and shares amounted, during a certain half-year, to £13,500, and during the following half-year to £36,000. At what rates per cent. could dividends on the preference shares and ordinary shares respectively be paid each half-year?

Half-yearly interest on Debenture Stock $= $ £7,500

Half-yearly dividend at 6 per cent. per annum on Preference shares $= $ £7,500

Amount available, first half, for dividend on Preference Shares $= $ £6,000

Let $r \equiv$ rate per cent. per annum of dividends on preference shares, 1st half-year.

$$\text{Then } 250,000 \times \frac{r}{200} = 6,000$$

$$\therefore r = 4\tfrac{4}{5}$$

No money is available 1st half-year for distribution among the holders of ordinary shares.

£21,000 is available 2nd half-year for distribution among the holders of ordinary shares.

Let $x \equiv$ rate per cent. per annum of dividends on ordinary shares, 2nd half-year.

$$\text{Then } 600,000 \times \frac{x}{200} = 21,000$$
$$\therefore \quad x = 7$$

Ansr.—$4\frac{4}{5}\%$, nil, 6%, 7%

EXAMPLE (viii)—

Referring to the previous question, had the preference shares been cumulative and if at the beginning of the 1st year mentioned there had been no arrears of dividends to make up, at what per cent. per annum could dividend on the ordinary shares have been declared for the 2nd half-year ?

Rate of dividend on preference shares, 2nd half-year $= 7\frac{1}{5}\%$ per annum.

$$\therefore \text{Total paid to holders of preference shares, 2nd half-yr.} = £250,000 \times \frac{36}{5 \times 200}$$
$$= £9,000$$

$\therefore$ Total paid to holders of ordinary shares, 2nd half-year $= £19,500$

Let $r \equiv$ rate per cent. per annum of dividends on ordinary shares.

$$\text{Then } 600,000 \times \frac{r}{200} = 19,500$$
$$\therefore \quad r = 6\frac{1}{2}$$

Ansr.—$6\frac{1}{2}\%$

EXAMPLE (ix)—

A certain company's capital (fully paid up) consists of 400,000 6 per cent. participating preference shares of £1 each, 600,000 8 per cent. participating ordinary shares of £1 each, and 100,000 deferred shares of £1 each. Any profit available after dividend at 15 per cent. per annum had been paid on the deferred shares was equally divided so that all shares were equally participating. During a certain year the profits available for distribution amounted to £125,500. What rates of dividend were received by each group of shareholders ?

Dividend at	6%	per annum on	preference shares		$=$	£24,000
,,	8%	,,	ordinary	,,	$=$	£48,000
,,	15%	,,	deferred	,,	$=$	£15,000

$\therefore$ Amount available for additional dividend $= £38,500$

$\therefore$ Additional dividend per 100 shares $= £\dfrac{38,500}{11,000}$

$$= £3\frac{1}{2}$$

$\therefore$ Respective rates per annum are $9\frac{1}{2}\%$, $11\frac{1}{2}\%$, and $18\frac{1}{2}\%$

EXAMPLE (x)—

A company has capital consisting of 50,000 ordinary shares of £1 each, fully paid, and a number of $5\frac{1}{2}$ per cent. debentures of £100. At the beginning of 1919 there were 18 of these debentures, of which 6 had to be redeemed at $102\frac{1}{2}$ at the end of the year out of the profits. Before paying off the debentures and paying interest on debentures, the profits at the end of 1919

amounted to £4,569.   A dividend of 7 per cent. was paid on the ordinary
shares.   How much was available for the reserve ?

Amount for redeeming 6 debentures	= £615
Interest on debentures	= £18 × 5½ = £99
Dividend paid to shareholders	= £3,500
∴ Amount available for reserve	= £4,569 − £4,214
	= £355

10. SINKING FUND AND DEPRECIATION.

In order to redeem debenture stock, or meet other liabilities at
some future date, a company usually creates a **Sinking Fund.**   This
fund consists of instalments appropriated from the profits, and
may or may not be invested in outside securities.   In some cases
the instalments are used for the payment of the premiums on
Sinking Fund Insurance Policies, while, in the case of redemption
of debentures, the instalments are frequently used to buy back
some of the debentures which have to be redeemed.

Whenever there be a wasting asset, such as a lease or machinery,
a charge called **Depreciation** is made against revenue, for the
purpose of replacing the asset when necessary.   The greater the
revenue obtained during any year, the greater should be the charge
set aside at the end of the year.

When the instalments of Sinking Funds and Depreciation are invested or
bear interest, a number of comparatively difficult problems arise which
require the aid of Logarithms for their solution.   These problems, some types
of which are dealt with in *The Principles and Practice of Commercial Arithmetic*
(Pitman & Sons, Ltd.) are therefore beyond the scope of this book.

EXAMPLE (xi)—

It was estimated that machinery costing £6,000 would bring in a total
revenue of about £75,000 18 years hence, by which time it would have to be
replaced.   It was decided to set aside 1 per cent. of each year's revenue
for repairs, and a certain fixed percentage for depreciation.   The instalments
for depreciation were kept in the business, but no interest allowed on the
same.   What was the total charge on a year's revenue of £4,500 ?   What
sum would have been available for the purpose of new machinery at the
end of 18 years if the total revenue had amounted to £90,000 and the old
machinery had been sold for £600 ?

Percentage charge on revenue for depreciation $= \dfrac{6,000}{75,000} \times 100$

$= 8$

Total charge on revenue of £4,500 $= £\dfrac{9}{100} \times 4,500$

$= £405$

Amount available for new machinery after 18
years $= £\dfrac{8}{100} \times 90,000 + £600$

$= £7,800$

EXAMPLE (xii)—

The sinking fund of a company during the period 1916–1919 inclusive was increased so that the instalment at the end of any year was one-tenth of the amount of the fund at the beginning of that year. At the beginning of 1916, the fund amounted to £2,476 12s. What was the amount of the fund at the end of 1919, assuming that the sinking fund (1) did not carry interest and (2) carried interest at 5 per cent. per annum ?

(1) Amount of fund at the end of 1919

$$= £2476\tfrac{3}{5} \times \left(\frac{11}{10}\right)^4$$

$$= £\frac{12383 \times 11^4}{5 \times 10^4}$$

$$= £3,625 \text{ 19s. 10d.}$$

(2)

	£
Amount of fund, beginning of 1916	= 2476·6
Interest on fund, during 1916	= 123·83
Instalment, end of 1916	= 247·66
Amount of fund, beginning of 1917	= 2848·09
Interest on fund, during 1917	= 142·4045
Instalment, end of 1917	= 284·809
Amount of fund, beginning of 1918	= 3275·3035
Interest on fund, during 1918	= 163·76517
Instalment, end of 1918	= 327·53035
Amount of fund, beginning of 1919	= 3766·59902
Interest on fund, during 1919	= 188·32995
Instalment, end of 1919	= 376·65990
Amount of fund, end of 1919	= 4331·58887
	= £4,331 11s. 0d.

11. INCREASE AND REDUCTION OF CAPITAL.

The nominal or authorized capital of a company may be increased in one or other of the following ways—

1. Issue of **new shares,** at par or at a premium.

2. Issue of **bonus shares** to the existing shareholders in proportion to the number of shares held by them (e.g. one bonus share for every four shares held).

Companies may **reduce** their nominal capital by **cancelling shares**

which have not been issued. By sanction of the Court, the nominal capital may be reduced as follows—

1. **Writing off uncalled capital** and thus reducing the nominal value of shares not fully paid (e.g. £1 shares on which 16s. has been paid can be considered as shares of 16s. each, fully paid).

2. **Cancelling lost capital,** either by reducing the nominal value of fully paid shares or by cancelling a proportionate number of shares held by each shareholder.

3. **Paying back capital,** either by buying back shares in the open market and then cancelling the same, or by reducing the number or nominal value of shares and paying cash to the shareholders to make up the difference.

The **paid-up capital may be reduced** by returning accumulated profits to **reduce the amount paid up** on each share (*e.g.*, if 5s. per £1 share fully paid be paid back to the shareholders, the shares would then be £1 shares on which 15s. had been paid).

EXAMPLE (xiii)—

A company whose capital formerly consisted of 250,000 fully paid £1 shares increased the nominal capital at the beginning of 1919 by distributing out of the reserve 1 fully paid share for each 4 shares held. If a dividend of 8 per cent. were paid at the end of 1919, what would a man receive who held 100 shares at the end of 1918 ? Deduct Income Tax at 6s. in the £.

Number of shares held in 1919 $= 125$

Dividend received, less Income Tax $= £125 \times \dfrac{8}{100} \times \dfrac{7}{10}$

$\qquad\qquad\qquad\qquad\qquad\qquad = £7$

NOTE 1.—Fractions of shares are not given : a man holding 7 shares would probably receive as bonus 1 share and 15s. cash.

EXAMPLE (xiv)—

A bonus of 15 per cent. was given to holders of fully paid £1 shares, by the distribution of fully-paid £1 shares at a premium of 4s. If a dividend of 10 per cent. be paid after the increase of capital, what would be received by a man who formerly held 1,600 shares ? If the capital formerly was £144,000, what would it be after the distribution of bonus shares ?

One bonus share is given for every $1\frac{1}{3} \times \dfrac{100}{15}$ shares (i.e. every 8 shares)

$\therefore$ Dividend received $\qquad = £(1,600 + 200) \times \dfrac{1}{10}$

$\qquad\qquad\qquad\qquad\qquad\qquad = £180$

Increased capital $\qquad\qquad = £144,000 + £18,000$

$\qquad\qquad\qquad\qquad\qquad\qquad = £162,000$

NOTE 2.—15 per cent. of £144,000 = £21,600, of which £18,000 is added to the Share Capital Account and £3,600 to the Share Premium Account, on which no dividend is payable.

EXERCISE (xv)—

A man held 720 £1 shares, on each of which 16s. 6d. was paid. In 1918 a dividend of 12 per cent. was paid by the company who issued the shares. At the beginning of 1919 a bonus was paid to the shareholders by discharging the call, and at the end of 1919 a dividend of 12 per cent. was again paid. What dividends were received by the man, and what percentage was the dividend received in 1919 on the amount actually paid up ?

$$\text{Dividend received, 1918} \quad = £720 \times \frac{33}{40} \times \frac{12}{100}$$

$$= £71 \; 5s. \; 7d.$$

$$\text{Dividend received, 1919} \quad = £720 \times \frac{12}{100}$$

$$= £86 \; 8s.$$

$$\text{Percentage yield on cash paid, 1919} \quad = 12 \times \frac{40}{33}$$

$$= 14\frac{6}{11}$$

EXAMPLE (xvi)—

The capital of a company consisted of 8,000 preference shares of £10 each, fully paid, and 160,000 ordinary shares of £1 each, fully paid. It was decided to buy back 1 preference share out of every 5 held, to buy back 1 ordinary share out of every 8 held, and to return 3s. 6d. on every ordinary share not bought back. What was the reduced nominal capital and the reduced paid-up capital ?

$$\text{Reduced nominal capital} \quad = £80,000 \times \tfrac{4}{5} + £160,000 \times \tfrac{7}{8}$$

$$= £204,000$$

$$\text{Reduced paid-up capital} \quad = £204,000 - £140,000 \times \frac{7}{40}$$

$$= £179,500$$

TEST EXERCISES II

(1) A company was authorized to issue 11,500 preference shares of £10 each and 235,000 ordinary shares of £1 each ; 9,450 preference shares were issued and fully paid ; 190,000 ordinary shares were issued and 17s. 6d. paid on each. What was the nominal capital, the issued capital, and the paid-up capital ?

(2) A company's nominal capital was £24,000, in shares of £1 each ; 20,000 shares were issued and 16s. 3d. paid up. If a call were made of 2s. 3d. on each share issued, and if all the unissued shares were to be issued and 18s. 6d. called on each, what would be the increase of paid-up capital ?

(3) Referring to the company of the previous example, if it had been required to obtain £5,250 by issuing all shares and making calls such that the same amount should be paid up on each of the 24,000 shares, what should these calls have been ?

(4) A company issued 4,000,000 7 per cent. Cumulative Preference Shares of £1 each at par, payable 1s. per share on application to be made before 8th March, 1920, and 19s. per share on 15th April, 1920. The first dividend thereon was paid on 1st July, 1920, accruing from the respective dates of the payments made in respect thereof and commencing with the date of allotment. A man made application for 3,200 shares and was allotted this

number on 10th March. What amount should he pay on 15th April, and what dividend (less Income Tax at 6s. in the £) should he receive on 1st July ?

(5) A certain company offered for sale 2,800,000 7½ per cent. cumulative participating preference shares at £1 each at par. The list of applications for purchase opened on 1st March, 1920, and closed 4th March, 1920. Payments were made as follows : 2s. 6d. on application, 5s. on acceptance, 5s. on 31st March, 1920, 7s. 6d. on 28th April, 1920. Payments in full could be made subject to a discount of 6 per cent. per annum on acceptance, or 31st March, 1920. A man applied for 1,250 shares on 2nd March, and was allotted this number on 8th March, when he completed payment for the shares. What did he pay on 8th March, 1920 ?

(6) Referring to the previous question, what should a man have paid on 28th April to complete purchase if he applied for 10,000 shares on 2nd March, was allotted 7,500 shares only on 8th March, and made payments at 5s. per share on 8th March and on 31st March ? (Reckon discount from 8th March.)

(7) A limited company issued 1,000,000 10 per cent. cumulative participating preferred ordinary shares of £1 each at par, with participating rights up to 15 per cent. in all. They were payable as follows : On application, 1s. per share ; on allotment, 4s. per share ; on 4th May, 1920, 5s. per share ; on 18th June, 1920, 10s. per share. The fixed dividends were payable half-yearly on 1st January and 1st July. The first dividend was payable on 1st July, 1920, at the rate of 10 per cent. per annum on the amount paid up on the shares in the case of moneys paid on application and allotment from the date of allotment, and, as to the remaining instalments, from the dates fixed for the payment of the several instalments. A man applied for 850 shares and was allotted this number on 11th March. What payments should he have made on 4th May and on 18th June, and what was the least dividend he was entitled to receive on 1st July, 1920 ?

(8) A company issued £230,000 5½ per cent. redeemable debenture stock at 88 per cent. and 40,000 ordinary shares of £10 each at par, payable as follows—

	Debenture Stock.	Ordinary Shares.
On Application	£5 per cent.	£0 10s. per share
„ Allotment	£13 „	£1 10s. „
„ 1st April, 1919	£20 „	£2 „
„ 1st July, 1919	£25 „	£2 „
„ 1st October, 1919	£25 „	£2 „
„ 15th December, 1919	—	£2 „

Assuming all stock and shares were allotted and all payments made when due, calculate the amounts received by the company on each date.

(9) Referring to the previous question, if 6 per cent. discount be allowed on instalments paid before the due dates, what should be paid to completely purchase, on allotment on 15th March, 1920, (1) £1,400 Debenture Stock, (2) 720 shares ?

(10) Referring to Question (8), the first payment of interest on Debenture Stock was 1st October, 1919, and first dividend on shares on 1st February, 1920. In both cases the amounts were calculated on the proportions of the nominal value represented by the payments made as from the date of allotment, and the due dates of subsequent instalments. What amounts should be paid to a man who purchased £4,000 Debenture Stock and 475 shares (on which a first dividend of 9 per cent. was paid), these being allotted to him on 15th March, 1919, and payments being made in accordance with the table ?

(11) A company invited applications for 12,000 shares at £10 each : 2 persons applied for 200 shares, 18 for 100 shares, 63 for 50 shares, 124 for

25 shares, 45 for 20 shares, 242 for 10 shares, 346 for 5 shares, and 485 for 1 share. The directors decided to allot the shares among the applicants for 5 shares or more, proportionately, as far as possible, to the number of shares applied for, neglecting fractions of shares, and then distribute the remaining shares among the applicants for 1 share. How many of the latter were successful in their application, and how many were allotted to each of the other applicants ?

(12) A cheque for £24 0s. 2d. was received by a person as a year's dividend on 560 £1 shares on each of which 17s. 6d. had been paid. If Income Tax at 6s. in the £ had been deducted, what percentage rate of dividend had been paid ?

(13) 350,000 £1 shares were issued by a company at a premium of 1s. 6d. per share. When a dividend of 6 per cent. is paid, what percentage interest on his money would a shareholder receive (1) if the shares were fully paid-up, (2) if 4s. were left unpaid on each share ?

(14) The capital of a company consisted of 80,000 7 per cent. preference shares of £1 each fully paid up, and 240,000 ordinary shares of £1 each, also fully paid up. If a year's profits amount to £26,540, what would be the greatest percentage rate of dividend (reckoning ½ per cent. but no other fraction) that could be paid on the ordinary shares, and what amount would be available for reserve ?

(15) Referring to the previous question, what would be the rate of dividend and the amount set aside for reserve if 15s. per share were paid up on the preference shares and 17s. per share on the ordinary shares ?

(16) Referring to Questions (14) and (15), what total dividend in each case would be received by a man holding 450 preference shares and 920 ordinary shares ?

(17) A man owned 25 7 per cent. participating preference shares at £10 each, 360 10 per cent. participating ordinary shares at £1 each, and 10 deferred shares at £100 each. The shares issued by the company were 8,000 preference shares, 300,000 ordinary shares, and 40 deferred shares, and all were fully paid up. After 20 per cent. dividend had been paid on deferred shares, all shares equally participated in remaining profits *pro rata* to their respective values. What is the man entitled to receive if half-yearly profits available for distribution amount to (1) £4,000, (2) £18,000, (3) £36,000 ?

(18) Referring to the previous question, what would the man be entitled to receive in case (3) had the ordinary and preference shares been non-participating ?

(19) The capital of a company consisted of 1,000,000 7½ per cent. participating preference shares of £1 each on which 16s. per share had been paid up, and 3,000,000 ordinary shares of £1 each fully paid. After 12½ per cent. dividend had been paid on the ordinary shares, all remaining profits were used for distribution among all shareholders in proportion to capital. What would the half-yearly profits have to be in order that (1) 10 per cent. dividend could be paid to the holders of ordinary shares, (2) 6 per cent. additional dividend could be paid to the holders of preference shares ?

(20) The capital of a company was as follows—

      100,000 7½ per cent. Cumulative " A " Preference Shares of £1 each.
      600,000 7½ per cent. Cumulative " B " Preference Shares of £1 each.
    2,000,000 10 per cent. Cumulative Participating Preferred Ordinary shares of £1 each.
      300,000 Ordinary Shares of £1 each.

All shares were issued and fully paid. As regards payment of dividend, the priority was in the order above, and after 15 per cent. dividend had been paid on the ordinary shares, 75 per cent. of the remaining profits were divided rateably among the holders of the preferred ordinary shares and the remainder

to the holders of the ordinary shares. If no arrears of dividend were payable on the cumulative preference shares, calculate the percentage dividends that could be payable each year if the profits during four consecutive years were to amount to £46,500, £158,500, £590,000, and £377,500 respectively.

(21) Referring to the company of the previous question, the percentage dividends paid during a number of years were as follows—

	"A" Pref. Shares.	"B" Pref. Shares.	Preferred Ord. Shares.	Ord. Shares.
1st year	6½%	—	—	—
2nd ,,	8½%	5%	—	—
3rd ,,	7½%	16%	—	—
4th ,,	7½%	9%	20%	—

Calculate the total dividends distributed each year. Also calculate what the profits during the 5th year should be in order that the holders of the ordinary shares should be entitled to receive a dividend of 10 per cent.

(22) Half-yearly dividends of 7, 5, 3½, 2½, 7½, 10 per cent. per annum respectively were paid on 7 per cent. cumulative preference shares during the first period of three years after they were issued. What percentage per annum of dividend should be paid the next half-year in order that all arrears should be wiped off ?

(23) The capital of a company is £240,000, made up of 6,000 7 per cent. participating preference shares at £10 each, 140,000 10 per cent. participating ordinary shares at £1 each, and 400 deferred shares of £100 each. All shares are fully paid and all shareholders equally participate after 20 per cent. dividend is paid on the deferred share capital. At what rates could dividend be paid on each when the yearly profits amount to (1) £14,700, (2) £21,400, (3) £33,400 ?

(24) Referring to the previous example, if the profits given be those during three consecutive years and if at the beginning of the period there be no arrears of dividend to be wiped off, at what rates could dividends be paid each year when both preference and ordinary shares are cumulative ?

(25) Referring to the company whose capital is stated in Example (20), at the end of a certain year the dividends paid on the "A" and "B" preference shares were at the rates of 7½ per cent. and 10½ per cent. respectively, and the total paid to the holders of the preferred ordinary shares was two-fifths of the total dividend distributed. At what rate was dividend paid on the preferred ordinary shares ?

(26) A man received a cheque for £87 8s. 3d., being dividend for six months at the rate of 18 per cent. per annum (Income Tax at 6s. in the £ deducted) on 1,500 shares of £1 each. How much was paid up on each share ?

(27) A company's capital consists of £8,500 6 per cent. debenture stock and 25,000 shares at £1 each, 17s. 6d. paid. What sum of money is required to pay a year's interest on debentures, to redeem £1,000 debenture stock at 104 per cent., and to pay a year's dividend at 7¼ per cent. on the share capital ?

(28) It was estimated that plant which cost £35,000 to erect would need to be replaced after 20 years at a cost of £30,000, and that during this period the revenue produced would be £400,000. If depreciation be charged against revenue at a constant rate, what percentage rate should this be ? What amount should be set aside at the end of a year during which the revenue was £22,750 ?

(29) The directors of a company set aside £800 at the end of each year to a Sinking Fund, the money being invested at 5 per cent. per annum. At the beginning of 1920 the amount in the fund was £6,239 14s. 10d. What will be the amount in the fund at the end of 1924 ?

(30) The sinking fund of a company was started at the end of 1911 by £2,500 being set aside. At the end of each of the following five years it was increased by one-sixth of the amount of the fund at the beginning of the year. What was the amount of the fund at the end of 1916 ?

(31) Referring to the previous question, calculate the amount of the fund had the instalments been invested at 5 per cent. per annum.

(32) At the end of 1918 a half-yearly dividend of 15 per cent. per annum was paid on certain £1 shares on each of which 17s. had been paid. The capital of the company was increased by discharging the call, so that each share was regarded as being fully paid. On 30th June, 1919, a half-yearly dividend of 13 per cent. per annum was paid. Calculate the amounts received as dividend on each occasion by a person who held 1,240 shares. Also, in the latter case, calculate the percentage dividend based on the amount actually paid up on the shares.

(33) A company had capital consisting of 330,000 £1 shares fully paid. At the beginning of 1920, one fully paid share was distributed as a bonus for every 8 shares held. At the end of 1920 a dividend of 8 per cent. was paid. What dividend (Income Tax at 6s. in the £ deducted) would a man receive who formerly held 792 shares ?

(34) The capital of a company was increased by discharging the call on £10 shares on which £8 2s. 6d. had been paid up and also by the distribution of 1 fully paid bonus share for every 10 previously held. By what percentage was the capital increased ?

(35) The capital of a company was 35,000 preference shares at £5, on each of which £4 5s. was paid up, and 240,000 ordinary shares at £1 each, fully paid. A bonus was given by discharging the call on the preference shares and distributing one fully paid £1 share at par to every 6 ordinary shares previously held. What was the increased capital of the company ?

(36) £8 10s. was paid up on each £10 share of a company, and the dividend at the end of the year was at the rate of 10 per cent. During the following year the call was discharged, and at the end of the year a dividend of 9 per cent. was paid. In what ratio was the dividend received by a shareholder increased or diminished ?

(37) Two bonus £1 shares at a premium of 5s. was distributed for every 15 shares held. By what percentage was the share capital increased ?

(38) The paid-up capital of a company was 70,000 shares at £5 each, on each of which £4 17s. 6d. was paid. £1 17s. 6d. per share was returned to the shareholders. By what amount was the paid-up capital of the company reduced ?

(39) £10 shares, on each of which £6 10s. was paid up, were replaced by 6 fully paid £1 shares and 10s. per £10 share was returned to the shareholders. By what percentages were the nominal capital and the paid-up capital reduced ?

(40) £5 shares, £2 15s. paid, were replaced by three £1 shares. What amount should be regarded as being paid up on each £1 share, the paid-up capital being the same as formerly ? 'What is the ratio of paid-up capital to nominal capital in each case ?

(41) The capital of a company was 50,000 preference shares of £1 each, 35,000 issued and 17s. 6d. paid on each share ; and 160,000 ordinary shares of £1 each, 120,000 issued and fully paid. By what amount is the nominal capital reduced by cancelling the unissued shares and replacing 8 preference shares by 7 fully paid £1 shares ?

(42) The subscribed capital of a company is : £60,000 in £10 preference shares, £8 5s. per share called up and paid ; and £140,000 in £1 ordinary shares, 16s. 6d. per share called up and paid. It was agreed to reduce capital by replacing 4 preference shares by 3 new fully-paid £5 preference shares and 10 ordinary shares by 7 new fully-paid £1 ordinary shares. By what amounts have the nominal capital and the paid-up capital been reduced ?

(43) By what amount is the liability of a man reduced who formerly held 28 preference and 450 ordinary shares in the company whose capital is stated in the previous example ?

(44) The subscribed capital of a company was £420,000 in £1 shares on which 16s. 8d. per share was paid up. Capital was reduced by returning to the shareholders the amount paid up on every 1 out of 6 shares, thus cancelling one-sixth of the shares. In addition 3s. 4d. on each of the remaining shares was returned. What was the new subscribed capital and by how much was the paid-up capital reduced ? If a dividend of 12½ per cent. be paid after the reduction what would a man receive, after deduction of Income Tax at 6s. in the £, who formerly held 330 shares ? By what amount would his liability be increased or reduced ?

CHAPTER III

12. TRADE

is the term given to the exchange and distribution of commodities. The **Board of Trade** is established to keep records of the trade carried on by the United Kingdom, and to make regulations with the idea of conferring mutual benefit upon those concerned.

Most manufacturers distinguish their goods from similar goods made by others by means of a **Trade Mark,** which gives to the purchaser a satisfactory assurance of the make and quality of the goods he is buying.

In buying goods, the purchaser should ascertain, in addition to the price, particulars concerning the payment of carriage, the time of delivery, the time of payment and the discount (if any) allowed. The weight of goods ; the total weight of goods and the cases, bags, wrappers, etc., in which they are packed ; and the weight of the cases, bags, wrappers, are respectively known as the **Net Weight,** the **Gross Weight,** and the **Tare.**

13. DOCUMENTS IN COMMON USE.

Particulars concerning some of the more important documents used in the carrying on of home trade are given as follows—

An **Order Note** gives particulars of the goods required by the purchaser and is sent by him to the firm from which he intends to buy.

The **Bought Note** is sent in reply to the Order Note and specifies exact particulars concerning the price, quality, delivery, and the terms of payment.

The **Consignment Note** is forwarded to the railway company or carrier and gives particulars of the goods they are required to convey. The carrier, on removing the goods for conveyance, signs a **Delivery Note,** thus making the company employing him responsible for their delivery. On delivering the goods, the purchaser signs a **Delivery Sheet,** thus relieving the railway company or carrier of responsibility.

The **Invoice** is usually sent with the goods. It gives details concerning the quantity, quality, and price of the goods and particulars as to delivery and terms of payment. In the case when goods are sold by weight, the gross weight, tare, and net weight are frequently stated. E. & O.E., which means " Errors and Omissions Excepted," is sometimes written on an invoice by the seller to protect him against any error or omission which might otherwise be to his disadvantage.

Instead of altering invoices, adjustments brought about by (1) damage to

goods, (2) the non-delivery of certain of the goods included in the invoice, (3) clerical mistakes, (4) the goods not being up to sample, quality, and (5) return of empties, are made by means of **Credit Notes** and **Debit Notes.** For example, supposing it were found on delivery that goods valued, say, at £20 were soiled, the purchaser, on returning the same to the seller, would send a debit note claiming a reduction of £20, and the latter, if acknowledging the same would forward to the former a credit note allowing the reduction.

In the case where considerable business frequently takes place between two firms, periodic settlement takes place, usually at the end of each month or quarter, when a **Statement,** summarizing particulars of goods purchased and allowances made since the previous day of settlement, is made out by the seller and forwarded to the purchaser.

14. PAYMENT FOR GOODS.

Manufacturers and merchants usually issue catalogues or trade lists in which the commodities they have for sale are priced at a higher figure than that at which they are prepared to sell to persons engaged in the trade. The difference between the list price and that at which persons in the trade can buy is known as **Trade Discount,** which is calculated as a percentage of the list price. The prices of commodities are subject to fluctuations, but manufacturers and merchants, instead of repeatedly issuing new trade lists, can vary their prices by simply altering the trade discounts.

Except in retail business to customers, it is the custom to buy goods on **credit,** that is to say, the purchaser, instead of paying cash at once for his goods, undertakes to pay at some future time. When, however, he is ready to pay before the expiration of the customary time, a **Cash Discount** is allowed him, and this is calculated as a percentage of the invoice price, that is, the price after trade discount has been deducted. Certain terms relating to cash discount are briefly explained as follows—

Prompt Cash means payment within a day or two, without cash discount.
Net Cash means payment, without cash discount, in from five to ten days.
2¼ per cent., one month, means payment within one month, less 2¼ per cent. cash discount.
Prompt Cash less three months, means that if payment be made within a day or two, interest for three months at 5 per cent. per annum is deducted.

A merchant might have several payments to make to the same firm, the payments being due at different dates. The date on which the total sum could be paid without loss to either side is known as the **equated time,** or the **average due date.** If any date, called the " zero " date (usually the date when the first payment is due) be fixed, then if £x_1 be due n_1 days after this date, £x_2 after

n_2 days from this date, £x_3 after n_3 days after this date, etc., the number of days after the " zero " date, assuming the rate of discount per annum to be the same in each case, will be given by—

$$\frac{x_1 n_1 + x_2 n_2 + x_3 n_3 + \ldots\ldots}{x_1 + x_2 + x_3 + \ldots\ldots}$$

The proof of this result is as follows—

Let $r \equiv$ rate of discount per annum
and $n \equiv$ number of days after zero date when total sum is payable.

Then, if all the separate payments were made on " zero " date the total discount would be

$$\frac{x_1 n_1 r}{36500} + \frac{x_2 n_2 r}{36500} + \frac{x_3 n_3 r}{36500} + \ldots$$

i.e. $\dfrac{r}{36500} [x_1 n_1 + x_2 n_2 + x_3 n_3 + \ldots]$

The discount if the total sum were paid on " zero " date is

$$\frac{(x_1 + x_2 + x_3 + \ldots\ldots) \, n \, r}{36500}$$

In order that there should be no loss to either side these discounts should be the same,

$$\therefore \quad \frac{(x_1 + x_2 + x_3 + \ldots\ldots) \, n \, r}{36500} = \frac{r}{36500} [x_1 n_1 + x_2 n_2 + x_3 n_3 + \ldots\ldots]$$

$$\therefore \quad (x_1 + x_2 + x_3 + \ldots\ldots) \, n = x_1 n_1 + x_2 n_2 + x_3 n_3 + \ldots\ldots$$

$$\therefore \quad n = \frac{x_1 n_1 + x_2 n_2 + x_3 n_3}{x_1 + x_2 + x_3}$$

It should be noted that this date is independent of the rate of interest provided it be the same in each case ; also that if " zero " date be taken as the date when the first payment is due, $n_1 = 0$.

EXERCISE (i)—

The list price of a suite of furniture was 45 guineas, the trade discount was 33⅓ per cent., and the cash discount 1½ per cent. What was the selling price of the suite ?

Trade discount	=	£15 15s.
List price, less trade discount	=	£31 10s.
Cash discount	=	£(·315 + 1575)
	=	9s. 5d.
∴ Net selling price	=	£31 0s. 7d.

NOTE 1.—The cash discount is based on the price after the trade discount has been deducted. In general, the quickest method of obtaining so much per cent. of a sum of money is to apply the approximate decimalization of money. For example, 2½ per cent. of £8 4s. 10d. = £(2 × ·08242 + ¼ × ·08242) = £·185445 = 3s. 9d. to the nearest 1d. Sometimes calculations are quickly made by remembering that 1¼% (or 3d. in the £), 1⅔% (or 4d. in the £), 2½% (or 6d. in the £), 3¾% (or 9d. in the £), and 5% (or 1s. in the £) are equivalent to $\frac{1}{80}$, $\frac{1}{60}$, $\frac{1}{40}$, $\frac{1}{80}$, and $\frac{1}{20}$ respectively.

EXAMPLE (ii)—

A manufacturer raised his list prices 25 per cent., diminished his trade discount from 33⅓ per cent. to 25 per cent., and altered his credit from 6 months to 3 months.   By what percentage were his net selling prices increased, reckoning discount at 5 per cent. per annum ?   What was the increased cash price of an article that could formerly be purchased for £52 ?

Let former list price	$= 100$	units
Then former list price, less trade discount	$= 66\frac{2}{3}$	,,
Then former cash discount	$= \dfrac{200}{3} \times \dfrac{1}{40}$	,,
	$= 1\frac{2}{3}$	,,
∴ former selling price for cash	$= 65$	,,
New list price	$= 125$	,,
New list price, less trade discount	$= 93\frac{3}{4}$	,,
New cash discount	$= \dfrac{375}{4} \times \dfrac{1}{80}$	,,
	$= 1\frac{11}{64}$	,,
∴ new selling price for cash	$= 92\frac{37}{64}$	,,
∴ Percentage increase of cash price	$= \dfrac{27\frac{37}{64}}{65} \times 100$	
	$= \dfrac{176500}{64 \times 65}$	
	$= 42\cdot4\ .\ .$	

$$\text{Increased cash price of article formerly costing } £52 = £52 \times \frac{92\frac{37}{64}}{65}$$

$$= £\frac{52 \times 5925}{64 \times 65}$$

$$= £\frac{1185}{16}$$

$$= £74\ \text{1s. 3d.}$$

Alternate Method.

$$\text{Percentage increase of cash price} = 100 \times \frac{125 \times \frac{3}{4} \times \dfrac{98\frac{3}{4}}{100}}{100 \times \frac{2}{3} \times \dfrac{97\frac{1}{2}}{100}} - 100$$

$$= \frac{125 \times 3 \times 3 \times 395}{4 \times 2 \times 390} - 100$$

$$= 142\cdot4\ .\ .\ . - 100$$

$$= 42\cdot4\ .\ .\ .$$

$$\text{Increased cash price of article formerly costing } £52 = £52 \times \frac{125 \times 3 \times 3 \times 395}{100 \times 4 \times 2 \times 390}$$

$$= £74\ \text{1s. 3d.}$$

EXAMPLE (iii)—

A manufacturer allows a trade discount of 33⅓ per cent. off his list prices, and thereby gains 7½ per cent. of the cost of manufacturing.   If the latter

were to increase by 20 per cent., what trade discount, to nearest $\frac{1}{4}$ per cent. should he allow so as to gain $12\frac{1}{2}$ per cent. of the increased cost to manufacture ?

$$\text{Let list price be} = 100 \text{ units}$$

$$\text{Then selling price} = 66\frac{2}{3} \quad ,,$$

$$\text{Then cost of manufacturing} = 66\frac{2}{3} \times \frac{100}{107\frac{1}{2}} \text{ units}$$

$$\text{Increased cost of manufacturing} = 66\frac{2}{3} \times \frac{100}{107\frac{1}{2}} \times \frac{120}{100} \text{ units}$$

$$\text{Increased selling price} = 66\frac{2}{3} \times \frac{100}{107\frac{1}{2}} \times \frac{120}{100} \times \frac{112\frac{1}{2}}{100} \text{ units}$$

$$= \frac{200 \times 240 \times 225}{3 \times 215 \times 200} \text{ units}$$

$$= 83\frac{37}{43} \text{ units}$$

$$\therefore \text{ Trade discount} = 16\frac{1}{4}\%$$

EXAMPLE (iv)—

Robert Brown & Co., 278 King Street, Bristol, purchased from Howard, Baker & Co., Ltd., 15 West Street, Leeds, the following : 8 pcs. 54″ Serge (F. 216) 4/52, 4/51 at 15s. 9d. per yd. ; 10 pcs. 48″ Tweed (K. 11) 6/48, 4/50 at 14s. 6d. per yd. ; 4 pcs. Vicunas 48″ (A. 79) 4/48 at 11s. 3d. per yd.   Make out the invoice, dated 21st April, 1920, $7\frac{1}{2}$ per cent. trade discount on Serge and Tweed and 5 per cent. on Vicunas, carriage paid, and terms $1\frac{1}{2}$ per cent. discount for cash.   Calculate the net amount for cash.

INVOICE.

15 *West Street,*
Leeds.
21st April, 1920

Messrs. R. Brown & Co.,
    278 *King Street, Bristol.*

BOUGHT OF HOWARD, BAKER & CO., LTD.

Terms : $1\frac{1}{2}\%$ cash.

			£	s.	d.	£	s.	d.
8	pcs. 54″ Serge (F. 216) 4/52, 4/51 = 412 yd.	15s. 9d.	324	9	–			
10	pcs. 48″ Tweed (K. 11) 6/48, 4/50 = 488 yd.	14s. 6d.	353	16	–			
			678	5	–			
	Less $7\frac{1}{2}\%$		50	17	4	627	7	8
4	pcs. 48″ Vicunas (A. 79) 4/48 = 192 yd.	11s. 3d.	108	–	–			
	Less 5%		5	8	–	102	12	–
						729	19	8
	Carriage Paid.							
	E. & O.E.							

$$\text{Cash discount} = £10 \text{ 19s. } 0d.$$

$$\therefore \text{ Net amount, cash} = £719 \text{ 0s. } 8d.$$

EXAMPLE (v)—

Goods were delivered by Messrs. Richards & Co., of Liverpool, to A. Hodson & Sons, Rochester, as follows : 2nd March, £32 4s. 8d. ; 10th March, £17 3s. 6d., 19th March, £53 11s. 2d. ; 27th March, £41 13s. 10d.

Messrs. Richards & Co., sent credit notes for return of empties as follows : 18th March, £1 2s. 6d. ; 26th March, £1 15s. 0d.

Make out the statement for the end of the month and calculate the net amount to be paid, the terms being 2 per cent. one month.

<div align="center">STATEMENT.</div>

Telephone :   *Liverpool,*

                                                     1*st April,* 19 . .

A. Hodson & Sons,

    Rochester.

<div align="center">DR. TO RICHARDS & CO.</div>

Folio :   Terms : *Net one month.*

Date			£	s.	d.	£	s.	d.
Mar. 2	To	Goods	32	4	8			
,, 10	,,	,,	17	3	6			
,, 19	,,	,,	53	11	2			
,, 27	,,	,,	41	13	10			
			144	13	2			
,, 18	By	Allowance as per Credit Note	1	2	6			
,, 26	,,	,, ,, ,, ,,	1	15	–			
			2	17	6			
			141	15	8			
		Less 2% discount	2	16	9			
		Net				138	18	11

EXAMPLE (vi)—

Find the equated time of paying the total of the following account—

Dr.	5th February, 1919	Goods	£175	Credit 3 months		
	28th March, 1919	,,	£320	,,	2	,,
	25th April, 1919	,,	£217 10s.	,,	2	,,

Also calculate the sum that, paid on 3rd May, would complete the total payment, reckoning discount at 5 per cent. per annum.

Let the zero date be 5th May.

Then £320, £217 10s. are payable 23 days, 51 days after zero date.

∴ Number of days after zero date £712 10s. is payable.

$$= \frac{175 \times 0 + 320 \times 23 + 217\frac{1}{2} \times 51}{712\frac{1}{2}}$$

$$= \frac{320 \times 46 + 435 \times 51}{1425}$$

$$= 26 \text{ to nearest day.}$$

∴ **£712 10s.** paid on **31st May** completes payment.

Discount on £712 10s. for 28 days $= £\dfrac{1425 \times 5 \times 28}{2 \times 36500}$

$$= £2 \text{ 14s. 8d.}$$

∴ **£709 15s. 4d.** paid on **3rd May** completes payment.

EXAMPLE (vii)—

Find the equated time of paying the balance of these accounts.

Dr.   25th March, 1920   Goods, £520 ;   Credit, 3 months
    13th April, 1920   ,,   £315 ;   ,,   4   ,,
    27th May, 1920   ,,   £425 ;   ,,   2   ,,
Cr.   9th April, 1920   By Cash, £50
    27th June, 1920   ,,   ,,   £625

Let the zero date be 9th April.

Then £625 was paid 79 days after zero date, and £520, £315, £425 are payable 77 days, 126 days, 109 days, respectively, after zero date.

∴ Number of days after zero date the balance of £585 is payable.

$$= \frac{-625 \times 79 + 520 \times 77 + 315 \times 126 + 425 \times 109}{585}$$

$$= \frac{-49375 + 126055}{585} = \frac{76680}{585}$$

$$= 131 \text{ to nearest day.}$$

∴ **£585** paid on **18th August, 1920,** completes payment.

15. CUSTOMARY TRADE UNITS.

Although the units **pound** (*Avoirdupois*), **yard, gallon** must be uniformly the same in all localities in the British Isles and with respect to trade in all commodities, yet in certain trades there

are certain units employed peculiar to the trades in question. A selection of some of the customary trade units is as follows—

Flour Weight.

14	pounds	=	1 peck *or* stone
56	,,	=	1 bushel
40	,,	=	1 boll
196	,,	=	1 barrel
280	,,	=	1 sack

Wool Weight.

7	pounds	=	1 clove
2	cloves	=	1 stone
2	stones	=	1 tod
6½	tods (182 lb.)	=	1 wey
2	weys	=	1 sack
12	sacks	=	1 last
20	pounds	=	1 score
12	score	=	1 pack

Cloth Measure.

2¼	inches	=	1 nail
4	nails	=	1 quarter (of a yd.)
3	quarters	=	1 Flemish ell
4	,,	=	1 yard
5	,,	=	1 English ell
6	,,	=	1 French ell

Linen Yarn Measure.

300	yards	=	1 cut
12	cuts	=	1 hank
16	hanks	=	1 bundle

Ale and Beer Measure.

9	gallons	=	1 firkin
4	firkins	=	1 barrel
1½	barrel	=	1 hogshead
2	hogsheads	=	1 butt
2	butts	=	1 tun

Hay Weight.

56	pounds	=	1 truss of old hay
60	,,	=	1 truss of new hay
36	trusses	=	1 load

Straw Weight.

36	pounds	=	1 truss
11 cwt. 64 lb.		=	1 load
36	trusses	=	1 load

Butter and Cheese Weight.

8	pounds	=	1 clove
56	,,	=	1 firkin
84	,,	=	1 tub
112	,,	=	1 Dutch cask
224	,,	=	1 barrel
256	,,	=	1 Suffolk wey
336	,,	=	1 Essex wey

Cotton Yarn Measure.

120	yards	=	1 skein
7	skeins	=	1 hank
18	hanks	=	1 spindle

Worsted Yarn Measure.

80	yards	=	1 skein
7	skeins	=	1 hank
144	hanks	=	1 gross

Wine Measure.

10	gallons	=	1 anker
18	,,	=	1 runlet
31½	,,	=	1 barrel
42	,,	=	1 tierce
63	,,	=	1 hogshead
84	,,	=	1 puncheon
2	hogsheads	=	1 pipe *or* butt
2	pipes	=	1 tun

Cereals are sold by weight, the **bushel** being reckoned as follows : Wheat—English, 60 lb. ; Foreign, 62 lb.   Barley—English, 50 lb. ; French, 52½ lb. ; Mediterranean, 50 lb.   Oats—English, 39 lb. ; Foreign, 38 and 40 lb.   Rye and Maize, 60 lb.   Buckwheat, 52 lb.

Fish.—Scotland and parts of England, 1 Cran = 37½ gall. ; Ireland and Isle of Man, 1 Maze = 5 long hundreds of 126 each ; East Coast of England, 1 Last = 13,200 fish, 1 long hundred = 132, 1 thousand = 1,320.   Cured herrings are sold by the barrel, the capacity of which is 26⅔ gall.

Timber and **Wood.**—50 cub. ft. of planks = 1 load ; the Petrograd standard consists of 165 cub. ft., or 120 pieces 1½″ × 11″ × 12′, or 120 pieces 3″ × 11″ × 6′. A cord of wood is 2¼ tons or 128 cub ft.

16. PROFIT AND LOSS.

For the purpose of minimizing the amount of arithmetical work in the solution of problems involving percentage gains and losses, the following generalizations are sometimes useful. The proofs of the statements are left as an exercise to the student—

(I) A gain of r % of the cost price is equivalent to a gain of $r \times \dfrac{100}{100 + r}$ % of the selling price.

A loss of r % of the cost price is equivalent to a loss of $r \times \dfrac{100}{100 - r}$ % of the selling price.

A gain of r % of the selling price is equivalent to a gain of $r \times \dfrac{100}{100 - r}$ % of the cost price.

A loss of r % of the selling price is equivalent to a loss of $r \times \dfrac{100}{100 + r}$ % of the cost price.

(II) When all the goods bought at a certain amount per unit are sold at a uniform price per unit, the percentage gain or loss is independent of the quantity of goods thus bought and sold.

(III) If $a_1, a_2 \ldots b_1, b_2 \ldots$ be the cost prices of goods respectively, and $r_1, r_2 \ldots$ be the percentage gains on the cost prices $a_1, a_2 \ldots$ respectively, and $s_1, s_2 \ldots$ be the percentage losses on the cost prices $b_1, b_2 \ldots$ respectively, then the percentage gain on the whole outlay will be

$$\frac{a_1\, r_1 + a_2\, r_2 + \ldots - b_1\, s_1 - b_2\, s_2 - \ldots}{a_1 + a_2 + \ldots + b_1 + b_2 + \ldots}$$

If $a_1, a_2 \ldots b_1, b_2 \ldots$ be the selling prices and $r_1, r_2 \ldots s_1, s_2$ be the percentage gains and losses respectively on the selling prices, the above formula will give the percentage gain on the total selling price.

If, on evaluating, it be found that the result is **negative**, then the numerical value will give the percentage **loss.**

(IV) If the cost price and selling price of a certain quantity of goods be each increased by r %, the percentage gain or loss will be unaltered, but the actual gain or loss will be increased by r %.

If the cost price and selling price be decreased by r %, the percentage gain or loss will remain the same, but the actual gain or loss will be decreased by r %.

(V) If the cost price and selling price be each increased by the same amount the actual gain or loss will be unaltered, but the percentage gain or loss on cost price will be reduced in the ratio of the increased cost price to the original cost price, and the percentage gain or loss on selling price will be reduced in the ratio of the increased selling price to the original selling price.

If the cost price and selling price be each decreased by the same amount, the actual gain or loss will be unaltered, but the percentage gain or loss on cost price will be increased in the ratio of the decreased cost price to the original cost price, and the percentage gain or loss on selling price will be increased in the ratio of the decreased selling price to the original selling price.

(VI) Keeping the expenditure the same, if the price per unit of goods be increased by r %, the quantity that can be bought will be reduced in the ratio $100 + r : 100$; i.e. by $\dfrac{100\, r}{100 + r}$ %; also if the price per unit be diminished by r %, the quantity bought for the same money will be increased in the ratio $100 - r : 100$; i.e. by $\dfrac{100\, r}{100 - r}$ %.

EXAMPLE (viii)—

A dealer bought a sack of flour : he sold $4\frac{1}{2}$ pecks at a gain of 6 per cent., $7\frac{1}{2}$ pecks at a gain of 4 per cent., and the remainder at a loss of 2 per cent. ; these gains and loss being based on cost price.   What percentage was the total gain of (1) the total cost price, (2) the total selling price ?

Percentage gain on total cost price
$$= \frac{4\frac{1}{2} \times 6 + 7\frac{1}{2} \times 4 - 8 \times 2}{20}$$
$$= \frac{41}{20} = 2 \cdot 05$$

Percentage gain on total selling price
$$= 2 \cdot 05 \times \frac{100}{102 \cdot 05}$$
$$= 2 \cdot 01 \text{ correct to } \cdot 01.$$

Ansr.—**2·05% ; 2·01%**

EXAMPLE (ix)—

A man sold four bicycles for 18, 16, 12, 10 guineas respectively, thereby making a gain of $7\frac{1}{2}$ per cent. of the total selling price.   He gained 15 per cent. by the sale of the first, 3 per cent. by the sale of the second, and lost 10 per cent. by the sale of the fourth.   All percentage based on selling prices, what percentage gain or loss did he obtain by selling the third, based (1) on the selling price, and (2) on the cost price ?

Let $r \equiv$ percentage gain by sale of the third bicycle, based on selling price,

then
$$\frac{18 \times 15 + 16 \times 3 + 12\,r - 10 \times 10}{56} = 7\frac{1}{2}$$
$$\therefore\ 270 + 48 + 12\,r - 100 = 420$$
$$\therefore\ 12\,r = 202$$

Percentage gain based on cost price
$$= \frac{101}{6} \times \frac{100}{83\frac{1}{6}}$$
$$= \frac{101 \times 100}{499}$$
$$= 20 \cdot 24 \text{ correct to } \cdot 01$$

Ansr.—**16⅚% ; 20·24%**

EXAMPLE (x)—

A retailer bought 1 cwt. 3 qr. 20 lb. of tea at £13 6s. per cwt. and sold it all at 2s. 8d. per lb.   Find the percentage gain based on (1) cost price, (2) selling price.   Had the cost price and selling price been each 2d. a lb. more, what would have been the percentage gains ?

Selling price of 1 cwt. of tea
$$= 2\frac{2}{3} \times 112 \text{ shillings}$$
$$= 298\frac{2}{3} \text{ shillings}$$

Gain by selling 1 cwt. of tea
$$= 32\frac{2}{3} \text{ shillings}$$

Percentage gain on cost price
$$= \frac{32\frac{2}{3} \times 100}{266}$$
$$= \mathbf{12 \cdot 28} \text{ correct to } \cdot 01$$

Percentage gain on selling price　　　　$= 12\cdot28 \times \dfrac{100}{112\cdot28}$

　　　　　　　　　　　　　　　　　　$= \mathbf{10\cdot94}$ correct to $\cdot01$

Percentage gain on increased cost price　$= 12\cdot28 \times \dfrac{266}{284\frac{2}{3}}$

　　　　　　　　　　　　　　　　　　$= 11\cdot47$ correct to $\cdot01$

Percentage gain on increased selling price $= \mathbf{10\cdot94} \times \frac{33}{34}$

　　　　　　　　　　　　　　　　　　$= \mathbf{10\cdot30}$ correct to $\cdot01$

EXAMPLE (xi)—

By buying and selling an article a man lost £23 6s. 8d. What would have been the loss had both the buying price and selling price been 10 per cent. higher ?

　　　Loss, at higher prices　　　$= £23\frac{1}{3} \times \dfrac{110}{100}$

　　　　　　　　　　　　　　　$= £25$ **13s. 4d.**

EXAMPLE (xii)—

During a certain year 17,461 tons of coal were consumed, and the average price per ton paid was £1 19s. 4d. During the following year the average price per ton had increased by $12\frac{1}{2}$ per cent., but the total sum paid for coal was the same. How many tons (to the nearest ton) were consumed ?

　　Quantity of coal consumed　　$= 17{,}461 \times \dfrac{100}{112\frac{1}{2}}$ tons

　　　　　　　　　　　　　　　$= \mathbf{15{,}521}$ tons

17. TURNOVER.

The amount of profit gained in any business depends mainly on : (1) the difference between cost and selling prices ; (2) the quantity of goods bought and sold ; (3) the expenses incurred in carrying on the business. The success of a business can be measured by the amount of the net profits during a trading period per unit of capital involved.

The quantity of goods bought and sold during a certain period is known as the **turnover,** and the time taken to buy and sell a quantity of goods of a certain value is known as the **period of turnover.**

Owing to the credit system of payment, four dates are involved in every transaction, namely—

　　(1) the date of the receipt of goods ;
　　(2)　　,,　　　　,,　　payment for goods ;
　　(3)　　,,　　　　,,　　dispatch of goods ;
　　(4)　　,,　　　　,,　　receipt of payment for the goods.

These dates are not necessarily in the order named, for the goods might be sold by a trader before the time comes for him to pay for them.

The period (2) to (4) is the **period of turnover for the trader's capital,** and the period (1) to (3) is known as the **period of turnover for the goods in stock.** The shorter these periods are, the greater will be the number of transactions per trading period.

A part of the expenses incurred in business is the warehousing of goods, and the greater the quantity of goods warehoused the greater the expense will be. Moreover, goods in the warehouse represent capital which bears no interest, and the goods are liable to depreciate. Thus, there are four good reasons why a trader should aim at reducing the time his goods are in stock, namely : (1) the turnover during the trading period will be greater ; (2) the expense of warehousing will be less ; (3) less capital is idle ; (4) less depreciation takes place in the goods.

EXAMPLE (xiii)—

X and Y start business at the beginning of a year by spending £2,800 in buying equal quantities of coffee at £14 per cwt. X sells at £15 per cwt. and Y at £15 15s. per cwt. X's monthly turnover is 175 cwt. and Y's 60 cwt., and each renews his stock at the above cost price at the end of each month. Calculate (1) their profits for the year ; (2) the average values of stock (cost) during the year, respectively ; (3) the average periods of turnover for the coffee in stock, respectively.

(1) X's and Y's stocks at the beginning of each month are each 200 cwt.

$$\text{X's yearly profit} = £175 \times 12 = £2,100$$
$$\text{Y's yearly profit} = £60 \times 1\tfrac{1}{4} \times 12 = £1,260$$

(2) Average quantity of coffee, X's stock $= \dfrac{200 + 25}{2}$ cwt. $= 112\tfrac{1}{2}$ cwt.

,,   ,,   ,, Y's ,, $= \dfrac{200 + 140}{2}$ cwt. $= 170$ cwt.

∴ Average value of X's stock $= £14 \times 112\tfrac{1}{2} = £1,575$

and   ,,   ,,   Y's ,, $= £14 \times 170 = £2,380$

(3) By the end of the year X has purchased $200 + 11 \times 175$ cwt. of coffee and has 25 cwt. left in stock.

∴ Quantity of coffee bought and sold by X $= 200 + 1,925 - 25$ cwt.

$$= 2,100 \text{ cwt.}$$

Let x days ≡ average period of turnover for X's coffee in stock,

then $\dfrac{x}{365} = \dfrac{112\tfrac{1}{2}}{2100}$

∴ $x = \dfrac{225 \times 365}{2 \times 2100} = 20$, to nearest day.

Quantity of coffee bought and sold by Y $= 720$ cwt.

∴ Average period of turnover for Y's coffee in stock $= \dfrac{170}{720} \times 365$ days

$$= 86 \text{ days, to nearest day.}$$

Example (xiv)—

A merchant had stock to the value of £2,560 at the beginning of a year : during the year he purchased goods to the value of £11,140, and at the end of the year the value of his stock was £3,250. Calculate the average period of warehousing and the number of times the average stock is turned over during the year. Reckoning interest at 5 per cent. per annum, find the loss of interest due to keeping goods in stock, per £100 worth of stock brought in and taken out of the warehouse.

Value of stock at beginning of the year	= £2,560
Value of purchases during the year	= £11,140
Total	= £13,700
Value of stock at end of the year	= £3,250
∴ Turnover during the year	= £10,450

Average value of goods in stock $= £\dfrac{2,560 + 3,250}{2} = £2,905$

∴ Average period of warehousing $= \dfrac{2,905}{10,450} \times 365$ days

$= \mathbf{101\ days,}$ to nearest day.

Number of times average stock is turned over during the year $= \dfrac{10,450}{2,905} = \mathbf{3\cdot60}$ to nearest ·01

Loss of interest due to each £100 worth of stock warehoused $= £\dfrac{101}{365} \times 5 = \mathbf{£1\ 7s.\ 8d.}$

TEST EXERCISES III

(1) The catalogue prices are 30 per cent. above the cost to produce. If the trade discount be 15 per cent., by what percentage would the selling prices be greater than the cost to produce ?

(2) A merchant was selling a certain kind of wine so as to gain 20 per cent. He increased the price by 2s. 6d. a bottle and his profit arose to 30 per cent. At what price per bottle was he selling the wine at first ?

(3) A dealer allowed 3 months credit. He sold goods to a retailer for £57 12s. 7d. What is the equivalent price for cash, reckoning discount at 6 per cent. per annum ?

(4) An article passes through the hands of three dealers, each of whom makes 10 per cent. profit on his outlay, and is sold by the last of the three for £11 1s. 10d. Find the original cost of the article.

(5) A profit of 5 per cent. is made by selling tea at £15 15s. per cwt. What profit, based on selling price, would be obtained by selling it at 3s. 2d. per lb. ?

(6) What percentage does a shopkeeper make where prices are 20 per cent. above cost price, if he allows his customers 2½ per cent. off their bills ?

(7) By selling goods for £700 a merchant gains 12 per cent. Find the gain per cent. he would have realized had he sold the goods for £750.

(8) A piano costing £57 10s. was sold for 60 guineas. Calculate the percentage gain if a cash discount of 1½ per cent. be allowed.

(9) The percentage profit based on selling price being 16⅔ per cent., what is the percentage profit based on cost price ?

(10) A merchant's terms were 25 per cent. trade discount, net cash, off list prices. What trade discount should he allow in order to increase the cash price by 10 per cent. ?

(11) After being allowed 33⅓ per cent. trade discount and 2 per cent. cash discount, a buyer paid £34 6s. for goods. What was the list price of the goods ?

(12) A dealer altered his trade discount of 20 per cent. to 15 per cent. By what percentage does he increase the selling prices ?

(13) If planks of wood 9 in. wide and 1 in. thick be sold at 2¼d. per foot, what is the equivalent price per Petrograd standard ?

(14) A retailer bought 8 tubs of cheese, the average gross weight being 3 qr. 12 lb., and the average tare 13½ lb. The list price was 245s. per cwt., the trade discount 5 per cent., and the cash discount 1½ per cent. What did he pay for the cheese, and what did he gain by selling it at 2s. 3d. per lb. ?

(15) Ale, listed at £11 17s. per hogshead, was sold at a trade discount of 10 per cent. What percentage gain would the purchaser obtain on his outlay by selling it at 8d. a pint ?

(16) Calculate the cost of 345 tons 13 cwt. 35 lb. of iron at £6 3s. 10½d. per ton.

(17) A fish merchant was offered cured herrings at £4 15s. per barrel carriage forward, or at £4 17s. 10d. carriage paid. The cash discount being 5 per cent. in each case, and the carriage being at 2s. 10d. per barrel, calculate the advantage gained by the merchant in accepting the latter terms, if he were to purchase 5 barrels.

(18) A dealer bought goods from a manufacturer who allowed him 20 per cent. trade discount and 3 months credit at 5 per cent. per annum. The dealer's list prices were 10 per cent. greater than those of the manufacturer and he allowed 15 per cent. off these list prices in selling to customers. What percentage profit did he gain on his outlay ? What was his selling price of an article which the manufacturer listed at £150 ?

(19) A retailer is allowed 25 per cent. trade discount off the prices in a manufacturer's list, and a cash discount of 2½ per cent. He wishes to price his articles such that, after allowing his customers 5 per cent. discount for cash, he will still gain a profit of 10 per cent. on his outlay. Find by how much per cent. the prices at which he marks the articles are greater or less than the manufacturer's list prices.

(20) Make out in proper form an invoice having the following items : Purchaser, Mr. A. Jones ; retailer, Messrs. C. Howard & Son, gentlemen's outfitters, 38 Bishop Street, Birmingham ; date of purchase, 7th April, 1920 ; articles bought, 1 sports coat, £2 17s. 6d. ; 1 pair of flannel trousers, £1 12s. 6d.; 4 collars at 11s. 6d. per dozen ; 3 pairs of socks at 2s. 9d. per pair.

(21) Complete the following invoice sent to B. Rawlinson, Esq.—

R. Hood & Co., House Decorators.

			£	s.	d.
Knot, stop, prime, and three coats of paint to woodwork, external	35 sq. yd.	1/7½			
Extra on for two coats varnish to entrances	16 ,,	1/6			
Size, stain, and two coats of varnish to woodwork, internal	138 ,,	1/4½			
Provide and fix brass grip handles	3 sets	11/6			
Provide and fix water taps	4	9/6			
5 per cent. discount for cash					

(22) Alfred Whitner & Co., Luton, purchased from Robert Hampton & Son, Halifax, the following : 8 pcs. Flannel (No, 1,157), 510 yd. at 1s. 9¼d. ;

3 pcs. Flannelette (No. 473), 185 yd. at 1s. 1¾d. ; 4 pcs. Holland (No. 713), 242 yd. at 1s. 4½d. Make out the invoice, dated 20th November, 5 per cent. trade discount, carriage paid, terms 2½ per cent. one month.

(23) Referring to the previous example, the Holland, not being up to sample, was returned. Make out, in proper form, the credit note to be forwarded by Robert Hampton & Son to Alfred Whitner & Co.

(24) S. Brice, Mungood & Co., Ltd., Birmingham, forwarded the following to N. Foley & Son, London : 40 brackets (F. III) 1/3½ ; 24 pocket knives, 18 at 2/3½d. 6 at 1/9½ ; 8½ doz. stair rods (H. 31) at 35/– per doz. ; 16 padlocks (413), 10½d. ; 10 baths, 3 (A. 17) at 18/6, 3 (A. 18) at 17/6, 4 (A. 20) at 15/9. Make out the invoice, 14th Mar., carriage paid, terms 1½ per cent. discount for cash.

(25) R. Sandford & Son, Margate, purchased, on 14th February, 19 . . from F. Williams & Co., Ltd., London, the following : Upright grand piano, 80 guineas, discount 20 per cent. ; drawing-room suite, 65 guineas, discount 15 per cent. ; sideboard, 36 guineas, 10 per cent. discount. The terms were prompt cash less 3 months and carriage paid. Make out the invoice in the proper form.

(26) Make out a statement rendered by D. Baker & Co., Wakefield, on 8th April, for the following transactions in March with E. Donkin & Co., Hull : Goods delivered on the 6th, £47 16s. 7d. ; on the 12th, £73 8s. 4d. ; on the 20th, £38 14s. 10d. ; on the 26th, £62 17s. 3d. ; goods returned by E. Donkin & Co. on the 23rd, £23 7s. 8d. Allow 1½ per cent. discount.

(27) Goods were delivered by Messrs. Broad & Co., London, to A. Stowbridge & Son, Guildford, as follows : 3rd June, £87 16s. 5d. ; 8th June, £47 3s. 2d. ; 12th June, £135 4s. 8d. ; 22nd June, £92 11s. 9d. ; 26th June, £37 4s. 4d. Messrs. Broad & Co. sent credit notes for return of empties as follows : 14th June, £1 12s. 6d. ; 28th June, £2 1s. 4d. A. Stowbridge sent £156 cash on account, 22nd June. Make out a statement for the end of the month, and calculate the net amount to be paid, the terms being 1½ per cent. one month.

(28) Find the equated time in the following : Goods £400, credit 30 days ; Goods £650, credit 40 days ; Goods £750, credit 50 days.

(29) Find the average due date on which the total of the following should be paid : Goods, £420 due 4th June ; Goods, £600 due 24th June ; Goods, £880 due 1st July. Also calculate the sum that, paid on 11th June, would complete payment, reckoning discount at 6 per cent. per annum.

(30) Find the equated time of—

April	1	Goods,	£85 ;	Credit,	3 months
,,	8	,,	£142 ;	,,	2 ,,
,,	19	,,	£93 ;	,,	2 ,,

(31) E. Broad purchased from A. Short as follows—

Sept.	8	Goods,	£410 ;	Credit,	2 months
,,	17	,,	£540 ;	,,	3 ,,
,,	27	,,	£285 ;	,,	3 ,,

The former forwarded £100 cash on 22nd September and £250 cash on 6th October. On what date is the balance due ?

(32) Referring to the previous example, what sum should be paid on 13th October to complete payment, reckoning discount at 5 per cent. per annum.

(33) Find the equated time of paying the balance of the following accounts—

Dr. Aug. 10	Goods	£84 10s.,	Credit 3 months.	*Cr.* Oct. 5th	Cash	£60
Sept. 1st	,,	£96 5s.	,, 4 ,,	Nov. 10th	,,	£150
Sept 8th	,,	£142 5s.	,, 2 ,,			

(34) A dealer purchased 75 qr. of wheat. He sold 30 qr. at a gain of 5 per cent. on his outlay, 20 qr. at a gain of 10 per cent. on the outlay, and the remainder at a gain of 10 per cent. on the returns. What was the percentage gain on the whole transaction based on (1) outlay, (2) returns ?

(35) A merchant purchased a quantity of wool. He sold ¼ of the quantity at a gain of 7½ per cent., ⅓ at a gain of 10 per cent., and the remainder at a gain of 12½ per cent. What was the percentage gain on the whole transaction ?

(36) A dealer bought a piano for 50 guineas, a wardrobe for £37 10s., and a suite for £66 5s. He gained 15 per cent. on his outlay by selling the piano, lost 10 per cent. by the sale of the wardrobe, and sold the suite at a gain of 5 per cent. What was the percentage gain on the whole ?

(37) A merchant bought 15 tons of metal and sold it all, thereby making a profit of 8 per cent. on his outlay. He gained 5 per cent. by the sale of 3 tons, 10 per cent. by the sale of 4 tons, and lost 6 per cent. by the sale of 2 tons. What was the percentage gain obtained by selling the remaining 6 tons ?

(38) A quantity of material was purchased and then sold as follows : ⅓ of the quantity, gain 7½ per cent. ; ¼ of the quantity, gain 10 per cent. ; ⅓ of the quantity, loss 5 per cent. What would be the percentage gain or loss obtained by selling the remainder if on the whole transaction there were (1) a gain of 4 per cent., (2) neither gain or loss, (3) a loss of 2 per cent. ?

(39) By what percentage can the consumption of coal be increased if the price per ton be reduced from £2 7s. to £2 0s. 6d. per ton, the total expenditure remaining the same ?

(40) A merchant bought a quantity of rice at £3 17s. 6d. per cwt. He sold ¼ of the quantity at 10½d. per lb., and ⅓ at 9½d. per lb. At what price per lb. must he sell the remainder so as to obtain a total gain of as near as possible 15 per cent. on the total outlay ?

(41) After selling 84 per cent. of a certain commodity at a certain price per unit, a man had received 8 per cent. more than the amount paid for the total quantity. If he were to sell the remainder at the same selling price per unit, what would be the percentage gain on his outlay ?

(42) The stock of a merchant was sold as follows : 24 per cent. of the total value was sold at a loss of 10 per cent., 35 per cent. at a loss of 5 per cent., 17 per cent. at a loss of 2½ per cent., and the remainder was sold at cost price. At what percentage loss was the whole stock sold ?

(43) At the beginning of a year a man had stock to the value of £1,735. His purchases during the year amounted to £13,125, and at the end of the year the value of stock was £3,245. What was the period of turnover, the number of times stock was turned over during the year, and the average cost of warehousing £100 worth of stock, reckoning interest at 6 per cent. per annum and rent at £75 per annum ?

(44) A man started business by purchasing 200 qr. of grain at 95s. per quarter. His monthly turnover was 172 qr., his selling price 102s. per qr., and he renewed his stock at the above cost price at the end of each month. What was his profit for the year, the average value of his stock, and the average period of turnover for the grain in stock ?

(45) The average value of goods in stock was £3,844 and the stock was turned over 3½ times during the year. What was the annual turnover ? What was the average cost of warehousing £100 worth of stock, reckoning interest at 6 per cent. per annum, depreciation at 5 per cent. per annum, and given that the rent of the warehouse was £180 per annum.

CHAPTER IV

18. IMPORT TRADE.

THERE are a variety of ways by which goods can be imported, but in general they fall into one or other of two fundamental methods, namely : (1) on **Consignment**, (2) by **Firm Contracts.**

By the first method, the goods are forwarded by the foreign exporter to an agent in this country, the function of the latter being to attend to all details in connection with the entry of the goods and to effect a sale. Instead of selling the goods himself, the agent may employ a broker, who may, or may not, sell the goods by auction in one of the exchanges. After deducting charges, which may include dock charges, insurance, warehousing, import duty, cartage, freight (if not already paid by the consignor), brokerage (if any), and his own commission, the agent remits the net proceeds to the consignor, or carries the amount to the latter's credit in the case of a periodic settlement. Particulars concerning the sale and the necessary charges are made out on an **Account Sales.** Thus, the goods are imported before a sale is effected, and the importer does not buy the goods himself, but renders service to the consignor and in return is allowed a commission based on the amount for which the goods are sold.

By the second method, the sale is effected before the goods are imported. In arranging the sale, details concerning payment, quality of goods, and terms of delivery should be made quite clear.

19. ACCOUNT SALES.

The expenses incurred from the time a ship arrives in port to the time of delivery of the goods in the importer's warehouse include : (1) Landing dues or wharfage ; (2) cost of opening cases, bags, or barrels for inspection of the goods by the officers of Customs and the re-packing ; (3) delivery, that is, the total cost of moving the goods, from the time of loading to the time of placing on carts, trucks, or barges for conveyance to the importer's warehouse ;

(4) cost of warehousing (if any) ; (5) cost of insurance while the goods are in charge of the Dock Authority ; (6) import duty (if any) ; (7) cartage or other transport of the goods from the docks to their destination.

Importers usually have periodic settlements with the Dock Authority and a floating policy as regards insurance.

When goods are imported on consignment and a broker is employed by the consignee to sell the goods, there would be two account sales : the broker's account sales to the consignee, and the latter's account sales to the consignor.

EXAMPLE (i)—

Sixty bales wool marked " B.R. 1/60 " were shipped on consignment by B. Rayner, Melbourne, to F. Taylor, London.   The gross weight was 210 cwt. 3 qr. 14 lb., and tare 7 cwt. 1 qr. 7 lb., and freight was at £13 10s. per ton, plus 10 per cent.   The consignee instructed a firm of brokers (S. Murkin & Co.) to sell the wool : bales 1/40, gross weight 140 cwt. 2 qr. 4 lb., tare 4 cwt. 3 qr. 14 lb. were sold at 1s. 7½d. per lb. ; and bales 41/60, gross weight 70 cwt. 1 qr., tare 2 cwt. 1 qr. 21 lb., were sold at 1s. 8d. per lb. ; sale expenses were 4d. per bale, and the brokerage ½ per cent.   The expenses to the consignee, whose commission was 2½ per cent., were : freight as above, insurance at 1s. 2d. per cent. on £2,000, dock dues at 8d. per bale, warehousing at 1s. 9d. per bale, cartage at 10d. per bale, and brokerage, etc., as stated.   Make out the account sales dated 8th April, 19 . ., and 13th April, 19 . ., respectively.

BROKER'S ACCOUNT SALES.
ACCOUNT SALES OF 60 BALES WOOL, SOLD BY AUCTION ON
6TH APRIL, 19 . ., FOR ACCOUNT OF F. TAYLOR.

Lot.	Bales.	Weight.	Price.	£	s.	d.
17	40 B.R. 1/40	140 2 4 gross 4 3 14 tare				
		135 2 18 net	1s. 7½d. per lb.	1,234	10	3
18	20 B.R. 41/60	70 1 – gross 2 1 21 tare				
		67 3 7 net	1s. 8d. per lb.	632	18	4
				1,867	8	7
Sale Expenses, 4d. per bale			£ 1 s. – d. –			
Brokerage, ½% of £1,867 8s. 7d.			9 6 9	10	6	9
		Net proceeds	£	1,857	1	10

LONDON,
   8th April, 19 . . .
      S. Murkin & Co.

CONSIGNEE'S ACCOUNT SALES.

ACCOUNT SALES OF 60 BALES WOOL, SOLD BY AUCTION ON
6TH APRIL, 19 . ., FOR ACCOUNT OF B. RAYNER.

Lot.	Bales.	Weight.	Price.	£	s.	d.
17	40 B.R. 1/40	140 2 4 gross 4 3 14 tare				
		135 2 18 net	1s. 7½d. per lb.	1,234	10	3
18	20 B.R. 41/60	70 1 — gross 2 1 21 tare				
		67 3 7 net	1s. 8d. per lb.	632	18	4
				1,867	8	7

		£	s.	d.			
Freight on 210cwts. 3qrs. 14lbs.. at £13 10s., plus 10%		156	11	6			
Insurance, £2,000 at 1s. 2d.%		1	3	4			
Dock Dues at 8d. per bale		2	—	—			
Warehousing at 1s. 9d. per bale		5	5	—			
Cartage at 10d. per bale		2	10	—			
Sale Expenses at 4d. per bale		1	—	—			
Brokerage, ½%		9	6	9			
Commission, 2½%		46	13	9			
					224	10	4
Net Proceeds				£	1,642	18	3

E. & O.E.

London,
   13th April, 19 . .
        F. Taylor.

NOTE 1.—The loss of weight of the goods during the voyage (in this case, 10 lb.) is known as the draft.
Both Brokerage and Commission are based on the selling price.

20. ACCOUNTS CURRENT.

An Account Current is a statement of transactions which have taken place between two parties acting as principal and agent during an accounting period, usually quarterly or half-yearly. In making out an Account Current, interest at some agreed rate is allowed on each item, in order to find the balance on the date which closes the accounting period.

EXAMPLE (ii)—

Thomas Ditton & Co., Ltd., London, sold goods for L. Rinhard & Co., New York, as follows : 6th April, net proceeds £1,420 12s. ; 4th May, net proceeds £2,485 6s. ; 25th May, net proceeds £1,734 4s. Remittances were

forwarded to L. Rinhard & Co. by Thomas Ditton & Co. as follows : £2,000 due on 11th May ; £1,500 due on 18th June.   The balance in favour of L. Rinhard & Co. at the beginning of the period 1st April to 30th June was £625 12s. 4d.   By means of an account current (as made out by L. Rinhard & Co.), find the balance on 30th June, allowing interest pro and con at 5 per cent. per annum.   (The Account Current appears on the next page.)

NOTE 2.—In order to find the balance of interest there is no need to calculate each item of interest separately.

Balance of interest at end of period

$$= £\frac{5}{36500} \left[\begin{array}{l} 1420{\cdot}6 \times 85 + 2485{\cdot}3 \times 57 + 1734{\cdot}2 \times 36 \\ - (2000 \times 50 + 1500 \times 12) + 625{\cdot}617 \times 91 \end{array} \right]$$

The quantity in the bracket consists of the sum of the products of the number of pounds with the number of days, in favour of T. Rinhard & Co. minus the sum of similar products in favour of T. Ditton & Co.   This quantity is independent of the rate of interest allowed.   Thus, in making out an account current, time is saved by finding the balance of products and calculating the number of pounds as balance of interest by multiplication by $\dfrac{\text{rate per cent. per annum.}}{36500}$

NOTE 3.—If Thomas Ditton & Co. had made out an account current it would have been similar to the above, but with the *Dr.* and *Cr.* sides reversed.   Accounts current are frequently made out in the currency of foreign countries : the method illustrated on page 49 applies equally well whatever the currency.   If a copy of interest tables be to hand it would be simpler to write in the interest on the separate items in place of the products.

It happens sometimes that one or more items are due for payment **after the last day** of the accounting period.   In this case it is usual to allow discount on these items at a rate numerically the same as the rate of interest allowed on the items due for payment before the last day of the accounting period.

The " discount " products are written in with red ink (printed in heavy type in the next example), and as discounts are deducted, in obtaining the total of products on either side of the account the sum of the discount products is deducted from the sum of the interest products.

EXAMPLE (iii)—

Referring to the previous example, if Thomas Ditton & Co., Ltd., had forwarded on 25th June to L. Rinhard & Co. a bill for £1,600 due on 10th August, make out the account current as it should then appear. (See p. 50.)

21. CUSTOMS AND EXCISE.

Import duties have to be paid on certain commodities entering the country for consumption.   The importer can either pay the duty as soon as the ship arrives, or allow the goods to be placed in a warehouse and pay the duty whenever he wishes the goods to be released.

In the first case, the importer, or the dock authority acting for him, states exact particulars concerning the goods on a document known as **Entry for**

To *Messrs. Thomas Ditton & Co.,*
London.

New York,
30th June, 19 . .

Dr.   IN ACCOUNT CURRENT WITH L. RINHARD & CO.   **Cr.**

Date		D'ys	Products	Amounts £	s.	d.	Date		D'ys	Products	Amounts £	s.	d.
19 . .							19 . .						
Apr. 1	To Balance of last A/c.	91	56,931	625	12	4	May 11	By Remittance	50	100,000	2,000	—	—
„ 6	„ Net Proceeds	85	120,751	1,420	12	—	June 18	„ „	12	18,000	1,500	—	—
May 4	„ „ „	57	141,662	2,485	6	—	„ 30	„ Balance of Products		263,775			
„ 25	„ „ „	36	62,431	1,734	4	—							
			381,775				„ 30	„ Balance car. forward		381,775	2,801	17	—
June 30	„ Bal. of Interest at 5%		263,775	36	2	8							
				6,301	17	—					6,301	17	—
July 1	„ Balance			2,801	17	—							

To Messrs. *Thomas Ditton & Co.,*
London.

New York,
30th June. 19 . .

IN ACCOUNT CURRENT WITH L. RINHARD & CO.

Dr.

		D'ys	Products	£	s.	d.
19 . .						
Apr. 1	To Balance of last A/ct.	91	56,931	625	12	4
" 6	" Net Proceeds	85	120,751	1,420	12	—
May 4	" " "	57	141,662	2,485	6	—
" 25	" " "	36	62,431	1,734	4	—
			381,775			
June 30	" Bal. of Interest at 5%		329,375	45	2	5
				6,310	16	9
July 1	" Balance			1,210	16	9

Cr.

		D'ys	Products	£	s.	d.
19 . .						
May 11	By Remittance	50	100,000	2,000	—	—
June 18	" "	12	18,000	1,500	—	—
" 25	" Bill due 10th Aug.	41	65,600	1,600	—	—
" 30	" Balance of Products		329,375			
			381,775			
" 30	" Balance car. forward			1,210	16	9
				6,310	16	9

Home Use *ex* **Ship,** which is then handed in at the Customs Office at the dock and the duty paid. When the examination of the goods has been carried out, and if the result agrees with the particulars stated, the goods are released as far as the Customs officials are concerned.

In the second case, particulars of the goods are entered on a **Warehouse Entry** and passed at the Customs House. An officer of Customs examines the goods, which are then kept in the control of the Government and sent to a warehouse. The goods are then said to be **In Bond.** When the importer wishes to obtain certain of the goods, he must fill in a **Warrant** and pay the amount of the duty on the goods he wishes to have released.

Excise Duties.—Certain commodities on which import duties are payable are produced in this country. In order that the home producer should not have a preference over his foreign competitor, and in order to obtain revenue, excise duties equivalent to the corresponding import duties are imposed.

Drawback.—Neither Customs nor Excise duties are payable on goods which are not consumed within the United Kingdom. In many cases, however, commodities are imported and duties paid, but after manufacture, etc., they are exported. On exportation, a sum called a " Drawback " is paid by the Customs authorities as repayment of the import duties.

Commodities affecting the life and industry of this country—for example, grain, meat, cotton, wool, metals, and timber—are not dutiable. The Customs Tariff of the United Kingdom (1920-21), in the case of some of the most important commodities, was as follows—

Commodities.		Rates of Duty.		
		£	s.	d.
*Tea	lb.		1	—
*Coffee	cwt.	2	2	—
Kiln-dried, roasted or ground . .	lb.			6
*Cocoa	cwt.	2	2	—
Husks and Shells . . .	cwt.		6	—
Preparation of Cocoa, Chocolate, Cocoa Butter	lb.			4½
*Fruit, Dried : Preserved without sugar, Currants,	cwt.		2	—
Figs, Fig Cake, Prunes, and Raisins .	cwt.		10	6
*Sugar : Not exceeding 76 degrees of polarization	cwt.		12	4
Exceeding 98 ,, ,,	cwt.	1	5	8
(The duties on sugar of polarization between 76 and 98 degrees vary between 12s. 4d. and £1 5s. 8d. cwt.)				
*Glucose : Solid	cwt.		16	3
Liquid	cwt.		11	8
*Saccharin, including substances of like nature or use	oz.		8	3
Spirits and Strong Waters.				
For every gallon computed at hydrometer proof of spirits of any description (except perfumed spirits), including Naphtha or Methylic Alcohol purified so as to be potable ; and mixtures and preparations containing spirits—				
Brandy, Rum	proof gall.	3	15	4

* Five-sixths of full rate on British Empire products.

Commodities.	Rates of Duty.		
	£	s.	d.
Imitation Rum, Liqueurs, Cordials, Mixtures, and other preparations containing spirits, not sweetened, provided that such spirits are not shown to be unenumerated, if tested . proof gall.	3	15	5
Perfumed Spirits . . . . . gall.	6	–	–
(Additional charges are made if the spirits are immature)			
Additional on Spirits imported in bottles . gall.		1	–
Wine. Not exceeding 30 degrees of Proof Spirit gall.		2	6
(60% of full rate on British Empire products)			
Exceeding 30 degrees but not exceeding 42 of Proof Spirit . . . . gall.		6	–
(66¾% of full rate on British Empire products)			
For every degree or part of a degree beyond 42 degrees an additional duty . gall.			6
Beer. Mum, Spruce, or Black Beer, and Berlin White Beer, and other preparations (whether fermented or not fermented) of a character similar to Mum, Spruce, or Black Beer, where the worts thereof were, before fermentation, of a specific gravity—			
Not exceeding 1,215 degrees . . . 36 gall.	20	2	–
Exceeding 1,215 degrees . . . 36 gall.	23	11	–
Beer of any other description where the worts thereof were, before fermentation, of a specific gravity of 1,055 degrees . . . 36 gall.	5	0	6
(And so on in proportion for any difference in gravity)			
*Tobacco, Manufactured.			
Cigars, plus an additional *ad valorem* duty of 50 per cent. (additional preferential rate, ¾ of 50 per cent.) . . . . lb.		15	7
Cavendish or Negrohead . . . lb.		11	10½
Cavendish or Negrohead, manufactured in Bond lb.		10	4½
Other Manufactured Tobacco, viz., Cigarettes . lb.		12	7
Other sorts . . . . . . lb.		10	4½
†Clocks, Watches, and components parts thereof . 33⅓% of value of article			
†Musical Instruments, accessories and component parts . . . . 33⅓% of value of article			
†Motor Cars, including Motor Bicycles and accessories and component parts thereof, other than Tyres, except Cars for use as Omnibuses, Ambulances, or for Trade Purposes . . 33⅓% of value of article			
Matches 10,000		5	2
†Cinematograph Films.			
Blank Film . . . . . . linear foot			½
Positives . . . . . . ,, ,,			1
Negatives . . . . . . ,, ,,			5

* **Five-sixths of full rate on British Empire products.**
† **Two-thirds of full rate on British Empire products.**

Customs Drawbacks on certain commodities are as follows : **Beer**, of an original specific gravity 1055°, £5 0s. 3d. per 36 gall. ; **Coffee, roasted and unmixed** with chicory or other substance, £2 2s. per 100 lb. ; **Cigars**, 9s. 3½d. per lb. ; **Cigarettes** 9s. 1d. per lb.

Excise Duties on certain commodities are as follows : Glucose, solid, 13s. 6½d. per cwt., liquid, 9s. 8⅘d. per cwt. ; Saccharin, 6s. 10½d. per oz. ; Beer, of specific gravity 1055°, £5 per 36 gall. ; Matches, 5s. per 10,000 ; Spirits, £3 12s. 6d. per proof gall. ; Tobacco, grown in the United Kingdom and manufactured in bond, 8s. 7¾d. per lb.

EXERCISE (iv)—

Calculate the import duty (at the given rates) on each of the following items : Motor car, c.i.f. value £942 (British Empire product) ; 5,000 ft. cinematograph film, negative ; 7 tons 6 cwt. 2 qr. 22 lb. of sugar, polarization 92·5° (duty £1 0s. 6·4d. cwt.).

Import duty on motor car			=	£942 × ⅓ × ¾	
			=	**£209 6s. 8d.**	
,, ,,		5,000 ft. film	=	25,000 pence	
			=	**£104 3s. 4d.**	

					£	s.	d.
,, ,,	146 cwt.	of sugar	=		149	17	10·4
,, ,,	2 qr.	,,	=		10		3·2
,, ,,	14 lb.	,,	=		2		6·8
,, ,,	8 lb.	,,	=		1		5·6
,, ,,	146 cwt. 2 qr. 22 lb.	,,	=	**£150**		**12**	**2**

EXAMPLE (v)—

A. Sutton & Co. imported coffee, net weight 32 cwt. 10 lb., at a c.i.f. price of £8 12s. per cwt. The charges were as follows : Customs Entry, 3s. 6d. ; Import Duty at £2 2s. per cwt. ; insurance on £400 at 10½d. per cent. ; Dock Charges and Rent, £7 11s. 3d. ; Cartage, £5 3s. 8d. What must the selling price per lb. be in order that A. Sutton & Co. should gain at least 8 per cent. of his total outlay ?

CHARGES.	£	s.	d.
Customs Entry		3	6
Insurance, £400 at 10½d.%		3	6
Dock Charges and Rent	7	11	3
Cartage	5	3	8
Total charges (excluding import duty)	13	1	11

∴ Total charges (excluding import duty) per cwt. of coffee $= £\dfrac{13\cdot096}{32\cdot0893} = £\cdot4081$

∴ Total outlay per cwt. of coffee $= £11\cdot1081$

∴ Selling price per lb. to gain 8% on cwt. $= £\dfrac{11\cdot1081 + \cdot8886}{112}$

$= £\cdot1071$

$= 2s.\ 1\cdot7d.$

∴ A. Sutton & Co.'s selling price to gain at least 8% on cost = **2s. 1¾d.**

22. EXPORT TRADE.

Goods are exported by—

1. An agent who has received an **Indent** from a foreign firm authorizing him to purchase certain commodities and arrange for their shipment to a specified port.

2. An agent commissioned by a wholesale trader, producer, or manufacturer to ship certain goods.

3. A wholesale trader, producer, or manufacturer.

The exporter's duties consist in attending to all arrangements for the placing of the goods on board ; in the proper filling up of Invoices, Bills of Lading, Insurance Certificates, etc. ; and in settling matters connected with cartage, dock charges, Customs formalities, and loading charges.

Although an invoice is a statement of goods bought, and goods shipped on consignment have yet to be purchased, yet an invoice is written out with reference to goods shipped in consignment for two reasons : (1) it indicates to the consignee the approximate minimum price at which he should sell ; and (2) it is required by the Customs authorities in connection with the Board of Trade statistics.

Comparatively few British traders export goods on consignment, for there are risks thereby of incurring serious losses. In the case of goods exported in accordance with firm contracts, drafts drawn against them are sometimes in foreign currency and sometimes in sterling, and they are usually payable at 60 or 90 days' sight.

23. KINDS OF INVOICES.

The expenses incurred in removing goods from a warehouse in one country to their destination in another country are so considerable that, in fixing prices, consideration must be given to the question as to how these expenses shall be divided between buyer and seller. The most important terms of sale are as shown on page 55.

Invoices on "Loco" and F.O.B. terms are used chiefly by manufacturers who export their own goods. The expenses paid by these are added to the net cost of the goods on the invoices.

Invoices on **C. & F.** terms are very rare in the export trade of this country, but are common in the import trade.

C.I.F. invoices are frequently used in connection with export to the Far East.

Terms.	Seller Defrays :	Buyer Defrays :
" Loco " (Price at place of Purchase)	Nil	1. Packing 2. Transport to Dock 3. Dock Charges 4. Export Duty (if any) 5. Loading Charges 6. Freight 7. Marine Insurance 8. Insurance against War Risks (if any) 9. Landing Charges 10. Import Duty (if any) 11. Dock Charges 12. Rent for Warehousing 13. Fire Insurance (if any) 14. Cartage or other transport charge 15. Commissions (if any)
F.A.S. (Free alongside Ship)	Expenses 1 to 4	Expenses 5 to 15
F.O.B (Free on Board)	Expenses 1 to 5	Expenses 6 to 15
C. & F. (Cost & Freight)	Expenses 1 to 6	Expenses 7 to 15
C.I.F. (Cost, Insurance and Freight)	Expenses 1 to 8	Expenses 9 to 15
" Franco " (Free)	Expenses 1 to 15	Nil

" **Franco** " terms are becoming more and more common in connection with trade with the Continent. Goods are sold " franco Lyons," " franco Genoa," etc., so that the would-be buyer would know without inquiry and calculation the total amount the goods would cost him.

C.I.F. and " Franco " invoices are expressed in the units and currency of the country to which the goods are being exported and, whenever possible, in the language of the foreign country. The tendency is to do this more and more ; and it is necessary for the maintenance and increase of the British export trade that British exporters should realize this, so as to cope with foreign competition. Thus it is seen that the methods of expressing quantities and prices in foreign units and currency should be known. As some importers buy goods in terms of foreign units and money, it is necessary to solve the converse problem of expressing these prices in terms of British weights, measures, and currency.

24. FOREIGN WEIGHTS AND MEASURES.

France, Belgium, Switzerland, Norway, Sweden, Portugal, Serbia, and most of the South American Republics use the Metric System of We'ghts and Measures Italy, Greece, Holland, Spain, Austria, Hungary, Germany, and Turkey use the units of this system, but under different names. The following particulars of the weights and measures of certain foreign countries are given for reference—

Italy uses *Metro* for Metre ; *Gramma* for Gram ; *Litro* for Litre ; *Ara* for Are ; *Etto* for Hecto ; *Chilo* for Kilo ; *Miria* for Myria ; *Ettara* for Hectare.

Greece uses *Pecheus* for Metre ; *Gramme* for mm. ; *Daktylos* for cm. ; *Palame* for dm. ; *Stadion* for Km. ; *Skionis* for Mm. ; *Stremma* for Are ; *Litra* for Litre ; *Kybos* for Ml. ; *Mystron* for cl. ; *Kotyle* for dl. ; *Koilon* for Hl. ; *Drachme* for Gram ; *Kokkos* for cgm. ; *Obolos* for dgm. ; *Mna* = Half Kgm.

Holland uses *El* for Metre ; *Streep* for Mm. ; *Duim* for cm. ; *Palm* for dm.; *Roede* for Dm. ; *Mijle* for Km. ; *Kan* for Litre ; *Vingerhold* for cl. ; *Maatje* for dl. ; *Vat* for Hl. ; *Wigtje* for Gran ; *Korrel* for dgm. ; *Lood* for Dgm. ; *Onze* for Hgm. ; *Pond* for Kgm.

Spain uses *Metro* for Metre ; *Litro* for Litre ; *Gramo* for Gram ; *Area* for Are.

Austria and **Germany** use *Stab* for Metre ; *Neuzoll* for cm. ; *Strich* for mm. ; *Kette* for Dm. ; *Kanne* for Litre ; *Schoppen* for Half-Litre ; *Fass* for Hl. ; *Neuloth* for Dgm. ; *Centner* = 50 Kgm. ; *Tonne* = 1,000 Kgm.

Turkey uses *Arshin* for Metre ; *Nal* for Km. ; *Shinik* for Dl. ; *Kileh* for Hl. ; *Evlek* for Are ; *Djeril* for Hectare ; *Oke* for Kgm. ; *Batman* for 10 Kgm. ; *Cantar* for Quintal ; *Tcheki* for metric ton.

Besides using the Metric system, **Spain, Bolivia, Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, Chili, Mexico,** and **Peru** make use of the **Old Spanish** system, which is as follows—

Spanish foot = 10·958 in. ; = *ara* (36 Pulgadas) is usually reckoned as 2·782 ft. ; *Fanegada* is about 1½ ac. ; *Castilian Libra* (16 Onzas) = 1·014 lb. ; *Quintal* (100 Libra) = 101·443 lb. ; *Arroba Mayor* (4 Cuartillas or 8 Azumbres or 32 Cuartillos) = 3·551 gall. ; *Farega* = 1½ bush.

The names and the British equivalents of some of the principal units made use of in other countries are as follows—

Russia.—*Stopa* (8 Vershok) = 14 in. ; *Arschine* = 28 in. ; *Saschine* = 7 ft. ; *Verst* = 1,166⅔ yd. ; *Dessiatine* = 2·7 acres ; *Funt* = ·9028 lb. ; *Poud* (40 Funt) = 06·114 lb. *Berkowitz* = 361·270 lb. ; *Vedro* = 2·704 gall. ; *Anker* = 8·114 gall. ; *Chetvert* = 46·2 gall.

Denmark.—*Tomme* = 1·029 in. ; *Fod* = 1·029 ft. ; *Alen* (2 Fod) = 2·059 ft. ; *Favn* (3 Alen) = 6·178 ft. ; *Tonde* = 1·363 acres ; *Pund* (16 Unser or 32 Lod) = 1·102 lb. ; *Centner* (100 Pund) = 110·231 lb. ; *Pot* (3 Poegle) = 1·699 pints ; *Kande* (2 Pot) = 3·398 pints ; *Viertel* (4 Kande) = 1·699 gall. ; *Anker* = 8·07 gall. ; *Tonde* = 28·885 gall. ; *Oxehoved* = 48·425 gall. ; *Tonde* (8 Skepper or 4 Fjerdingkar) = 3·823 bushels.

United States.—The Imperial units *lb.* and *yard* are used ; but instead of the units cwt. and ton, the units *Cental* (= 100 lb.) and *Short Ton* (= 20 centals or 2,000 lb.) are employed : 2,240 lb. (or 20 cwt.) is called a *Long Ton*. The U.S. *Bushel* = ·9694 Imperial bushels. The U.S. *Gallon (dry measure)* is ⅛ U.S. bushel ; but the U.S. *Gallon (liquid measure)* = 231 cubic inches approx., and is thus ⅚ of the Imperial gallon : ⅛ of a U.S. gallon (liquid) is termed a pint (= 20 fluid ounces = 160 fluid drams = 9,600 minims), so that each unit in fluid measure is ⅚ of the Imperial unit bearing the same name. In the parts of Canada where the descendants of the French colonists live, the Metric System is still partially in use.

Australia and **New Zealand** use the *Imperial weights and measures.*

India.—Imperial units are used in the case of trade between members of the white population. The units used by the natives are as follows : *Gux* = 33 in. ; *Bigha* (Bengal) = ·625 acre ; *Cawny* (Madras) = 1·33 acre ; *Tola* (rupee-weight) = 180 grains ; *Seer* (80 tolas) = 2 lb. 1 oz. ; *Maund* (40 seers) = 82·28 lb. ; *Maund* (Madras) = 24·68 lb. ; *Candy* (Madras) = 500 lb. ; *Visham* = 3 lb. ; *Dangali* = 3 pints; *Parah* = 15 gallons ; *Catty* (Singapore) = 1⅓ lb. ; *Pikul* = 100 catties = 133 lb.

Egypt.—*Pic* (textiles) = 22·83 in. ; *Feddan* (land) = 1·038 acres ; *Oke* = 2·75136 lb. ; *Cantar* = 99·05 lb. ; *Ardeb* of wheat or maize = 118 okes = 324·66 lb., *Ardeb* of barley = 88 okes = 242·12 lb. ; *Ardeb* of rice = 152 okes = 418·21 lb.

Channel Islands.—	JERSEY.	GUERNSEY.
Vergée (Normandy rood)	·44 acre	·4 acre
Bushel	8·9 gallons	5·8 gallons
Pound	7,561 grains	7,623 grains
Cwt.	(104 pounds) = 112·3 lb.	(100 pounds) = 108·9 lb.

South Africa.—Imperial units are used, but some old Dutch measures are still employed : *Leaguer* = about 128 gall. ; *Hatf Aum* = 15½ gall. ; *Anker* = 7½ gall. ; *Muid* = 3 bushels ; *Morgen* = 2·11654 acres ; *Cape foot* = 1·033 ft. ; *Short Ton* = 2,000 lb. By law, the Metric System has been introduced recently ; but, with the exception of chemists, who must use the Metric System, the use of the Imperial standards is allowed.

Japan.— *Ki* = 2·4403 miles ; *Square Ki* = 5·9553 sq. miles ; *Cho* = 5·423 chains ; *Square Cho* = 2·4507 acres ; *Ken* = 1·9884 yards ; *Tsubo* = 3·9538 sq. yards ; *Liquid Koku* = 39·7033 gallons ; *Dry Koku* = 4·9629 bushels ; *Koku of capacity* = ·1 ton ; *Liquid Sho* = 1·5881 quarts ; *Dry Sho* = ·1985 pecks ; *Kwan* = 8·2673 lb. ; *Kin* = 1·3228 lb.

China.—*Tall weight* = 1·33 oz. ; *Catty weight* = 1·33 lb. ; *Picul weight* = 133·33 lb. *Ts'un* = 1·41 in. ; *Ch'ih* = 1·175 ft. ; *Chang* = 11·75 ft. ; *Li* = 2·115 ft.

25. TABLES OF EQUIVALENT VALUES

are often used, examples of which are given as follows. It is left for the student to complete the tables up to 9 in each case, and to use the tables so constructed in a manner as shown in Example VII on page 59.

WEIGHT (*Avoirdupois*).

	Grains to Milligrams	Milligrams to Grains	Ozs. to Grams	Grams to Ounces	Lbs. to Kilograms.	Kilograms to Lbs.	Cwts. to Quintals.	Quintals to Cwts.	Tons to Tonnes	Tonnes to Tons.
1	64·8	0·015	28·35	0·03527	0·45359	2·20462	0·508	1·968	1·0160	0·9842
2	129·6	0·030	56·70	0·07054	0·90719	4·40924	1·016	3·936	2·0320	1·9684

TROY WEIGHT.

	Ounces Troy to Grams.	Grams to Ounces Troy.	Dwts. to Grams.	Grams to Dwts.
1	31·1035	0·03215	1·5552	0·643
2	62·2070	0·06430	3·1104	1·286

APOTHECARIES' WEIGHT.

	Scruples to Grams.	Grams to Scruples.	Grains to Grams.	Grams to Grains.
1	1·296	0·7716	0·0648	15·432
2	2·592	1·5432	0·1296	30·864

APOTHECARIES' MEASURE.

	Fluid Drachms to Millilitres.	Millilitres to Fluid Drachms.
1	3·552	0·28153
2	7·104	0·56306

LINEAR MEASURE.

	Inches to Centi-metres.	Centi-metres to Inches.	Yards to Metres.	Metres to Yards.	Miles to Kilo-metres.	Kilo-metres to Miles.
1	2·5400	0·3937	0·91438	1:09363	1·60931	0·62138
2	5·0800	0·7874	1·82876	2·18726	3·21862	1·24276

SQUARE MEASURE.

	Sq. Inches to Sq. Centi-metres.	Sq. Centi-metres to Sq. Inches.	Sq. Feet to Sq. Deci-metres.	Sq. Deci-metres to Sq. Feet.	Sq. Yards to Sq. Metres.	Sq. Metres to Sq. Yards.	Acres to Hec-tares.	Hec-tares to Acres.
1	6·4516	0·155	9·2903	0·10764	0·8361	1·1960	0·40468	2·47114
2	12,9032	0·310	18·5806	0·21528	1·6722	2·3920	0·80936	4·94228

CUBIC MEASURE.

	C. Inches to C. Centi-metres.	C. Centi-metres to C. Inches.	C. Feet to C. Metres.	C. Metres to C. Feet.	C. Yards to C. Metres.	C. Metres to C. Yards.
1	16·3871	0·061024	0·02832	35·3148	0·7645	1·3080
2	32·7742	0·122048	0·05664	70·6296	1·5290	2·6160

CAPACITY.

	Quarts to Litres.	Litres to Quarts.	Gallons to Litres.	Litres to Gallons.	Bushels to Deka-litres.	Deka-litres to Bushels.	Quarters to Kilo-litres.	Kilo-litres to Quarters.
1	1·1359	0·8803	4·5435	·2201	3·637	0·275	0·2909	3·4375
2	2·2718	1·7606	9·0870	·4402	7·274	0·550	0·5818	6·8750

EXAMPLE (vi)—

Given that £1 = 80·55 lire, find multipliers, correct to 4 places of decimals, to convert—

(1) Lire per chilolitro to shillings per quarter.
(2) Pence per mile into lire per chilometro.
(3) £ per acre into lire per ara.

Express—
  (a) 574·4 lire per chilolitro in s. d. per quarter.
  (b) 1·45d. per mile in lire per chilolitro.

(1) 1 lire per chilolitro $= \dfrac{20}{80·55}$ shillings per 3·4375 qr.

$= \dfrac{20}{80·55 \times 3·4375}$ shillings per qr.

$= ·0722$ shillings per qr.

(2) 1d. per mile $= \dfrac{80·55}{240}$ lire for 1·60931 chilometro

$= \dfrac{80·55}{240 \times 1·60931}$ lire per chilometro

$= ·2086$ lire per chilometro

(3) £1 per acre $= 80·55$ lire per 40·468 are

$= \dfrac{80·55}{40·468}$ lire per ara

$= 1·9905$ lire per ara.

(a) 574·4 lire per chilolitro $= 574·4 \times ·0722$ shillings per qr.

$= 41s. 6d.$ per qr. to nearest 1d.

(b) 1·45d. per mile $= 1·45 \times ·2086$ lira per chilometro

$= ·3025$ lira per chilometro.

EXAMPLE (vii)—
Using result (3) of Example (vi), draw up a nine-multiple table converting £ per acre into lire per ara and *vice versâ*. Use the table to convert £17 8s. 6d. per acre into lire per ara, and 27·40 lire per ara into £ s. d. per acre.

£ per Acre.		Lire per Ara
·5024	1	1·9905
1·0048	2	3·9810
1·5072	3	5·9715
2·0096	4	7·9620
2·5120	5	9·9525
3·0144	6	11·9430
3·5168	7	13·9335
4·0192	8	15·9240
4·5216	9	17·9145

£10   per acre   = 19·905   lire per ara
7   ,,   = 13·9335   ,,   ,,
·4   ,,   = ·7962   ,,   ,,
·02   ,,   = ·0398   ,,   ,,
·005   ,,   = ·0099   ,,   ,,

£17·425   ,,   = 34·68   ,,   ,,

20   lire per ara   = £10·048 per acre
7   ,,   ,,   = £ 3·5168   ,,
·40   ,,   ,,   = £ ·2010   ,,

27·40   ,,   ,,   = £13·766   ,,

  = £13 15s. 4d. per acre.

EXAMPLE (viii)—

450 Dry Koku of a commodity was bought for 8,720 yen. Given that 1 yen = 2s. 4¾d., calculate the equivalent price in s. d. per qr. (capacity).

Cost of $450 \times 4 \cdot 9629$ bushels $= 8720 \times 28\frac{3}{4}$ pence

$\therefore$ Cost of 1 quarter $= \dfrac{8720 \times 115 \times 8}{4 \times 12 \times 450 \times 4 \cdot 9629}$ shillings

$= $ **74s. 10d.** to nearest penny.

EXAMPLE (ix)—

A merchant can sell a commodity at 23s. 9d. per cwt. At what price in dollars (to nearest $\frac{1}{8}$ cent.) per cental should he buy in order to gain a profit of 5 per cent. on his outlay, given that $\pounds 1 = \$3 \cdot 95\frac{1}{2}$?

$\pounds 1\frac{3}{16}$ per cwt. is equivalent to $\quad \$\frac{19}{16} \times 3 \cdot 955$ per 1·12 cental

i.e. to $\quad \$\dfrac{19 \times 3 \cdot 955}{16 \times 1 \cdot 12}$ per cental

$\therefore$ Price, in order to gain profit, of 5% $= \$\dfrac{19 \times 3 \cdot 955 \times 100}{16 \times 1 \cdot 12 \times 105}$ per cental

$= $ **$3·99⅛ per cental.**

26. PREPARATION OF INVOICES.

Invoices on " Loco," F.O.B., C. & F., C.I.F., and " Franco " terms are made out by methods illustrated by the following examples—

EXAMPLE (x)—

S. Purser & Co., Wakefield, received an indent from Messrs. Raconi & Co., Bombay, by which 5 cases, marked $\boxed{\begin{array}{c}\text{RACONI,}\\\text{BOMBAY.}\end{array}}$ 1/5 containing altogether 30 pieces 48″ Tweeds, were to be purchased and shipped to Bombay.   S. Purser & Co. carried out instructions, particulars being as follows—

30 pcs. 48″ Tweeds, 18/52, 6/51½, 6/51, at 10s. 11d. per yard net. Charges: Packing at 12s. 6d. per case; Railway Transport, £2 3s. 6d.; Dock Charges, 13s. 9d.; Freight at 115s. 6d. and 10 per cent. primage per ton of 40 cub. ft., each case measuring 50″ × 24″ × 16″; Marine Insurance on £900 at 3s. 4d. per cent, plus 5 per cent; Commission, 2½ per cent.

Make out invoices on (1) " Loco," (2) F.O.B., (3) C. & F., (4) C.I.F. terms.

" LOCO " INVOICE.

Invoice of 5 cases Tweeds, shipped by the undersigned per s.s. *Anglia*, Liverpool, for Bombay, by order and for account and risk of Messrs. Raconi & Co.

Insurance effected here.   *Indent No.* 713.

		£	s.	d.	£	s.	d.
RACONI, BOMBAY 1/5	5 cases containing— 30 pcs. 48″ Tweed, 18/52, 6/51½, 6/51 = 1,551 yd. at 10s. 11d. net				846	11	9
	Packing 5 cases at 12s. 6d.	3	2	6			
	Railway Transport	2	3	6			
	Dock Charges		13	9			

	Freight on 55⅝ cub. ft. £ s. d.
	     at 115s. 6d. = 8 – 5
	          10% = 16 1						

		8	16	6			

	Marine Insurance on £ s. d.
	   £900 at 3s. 4d.% = 1 10 –
	          5% = 1 6						

		1	11	6			
					16	7	9
					862	19	6
	Commission 2½%				21	11	6

	E. & O.E.
	   Wakefield,
	     9th April, 19 . .
	        S. Purser & Co.
					884	11	–

On F.O.B. terms the cost to S. Purser to purchase the goods and have them placed on board at Liverpool is the total of cost price, packing, railway transport, and dock charges.

$$\therefore \text{ Total cost of goods on board} \quad = \quad \begin{matrix} £ & s. & d. \\ 852 & 11 & 6 \end{matrix}$$

$$\text{Commission } 2\tfrac{1}{2}\% \quad = \quad 21 \quad 6 \quad 3$$

$$\therefore \text{ Cost per yard on F.O.B. terms} \quad = \quad 873 \quad 17 \quad 9 \div 1551$$

$$= \text{ 11s. } 3\tfrac{1}{4}\text{d.}$$

F.O.B. INVOICE.

Insurance not effected by us. *Indent No.* 713.

		£	s.	d.
RACONI, BOMBAY 1/5	5 cases containing— 30 pcs. 48″ Tweeds, 18/52, 6/51½, 6/51 = 1,551 yd. at 11s. 3¼d. f.o.b. Liverpool E. & O.E. Wakefield, 9th April, 19 . . S. Purser & Co.	874	1	1

		£	s.	d.
Total cost of goods on board plus freight	=	861	8	–
Commission 2½%	=	21	10	8
∴ Cost per yd. on C. & F. terms	=	882	18	8 ÷ 1,551
	=	11s.	4⅝d.	

C. & F. INVOICE.

Insurance not effected by us. *Indent No.* 713.

		£	s.	d.
RACONI, BOMBAY 1/5	5 cases containing— 30 pcs. 48″ Tweeds, 18/52, 6/51½, 6/51 = 1,551 yd. at 11s. 4⅝d., C. & F., Bombay E. & O.E. Wakefield, 9th April, 19 . . S. Purser & Co.	882	18	9

On C.I.F. terms, all charges involved in exporting, together with Marine Insurance, are included in the price which is given in the currency of the country to which the goods are shipped. European merchants in India mostly use the Imperial weights and Measures. Suppose that at the time of shipment 1 rupee (= 16 annas) = 2s. 3¼d.

$$£884 \ 11s. \ = \ \frac{17691 \times 12}{27\frac{1}{4}} \ \text{rupees}$$

$$\therefore \text{Cost per yard on C I.F. terms} \ = \ \frac{17691 \times 12 \times 8}{219 \times 1551} \ \text{rupees}$$

$$= 5 \text{ rupees } 0 \text{ annas.}$$

C.I.F. INVOICE.

Insurance effected by us.   *Indent No. 713.*

		Rupees.	Annas.
RACONI, BOMBAY 1/5	5 cases containing— 30 pcs. 48″ Tweeds, 18/52, 6/51½, 6/51 = 1,551 yd. at Rs. 5.0 c.i.f. Bombay E. & O.E. *Wakefield,* *9th April,* 19 . . *S. Purser & Co.*	 7,755	 –

EXAMPLE (xi)—

Suppose that the Tweeds of the previous example were to be sold on "Franco" terms by S. Purser & Co. to D. Jacques & Cie., Grenoble, and that the charges were—

Packing, Transport to Liverpool, Dock Charges, same as before ; Freight at 47s. 6d. and 10 per cent. primage ; Marine Insurance on £900 at 1s. 10d. per cent. ; Landing Dues, Dock Charges, etc., and Transport from Marseilles to Grenoble, fcs. 1174.80 ; Commission, 2½ per cent. Also suppose that 2½ per cent. discount off quoted price to be allowed.

Make out the "Franco" invoice, given that £1 = Fcs. 57.60.

	£	s.	d.
Net cost of goods	846	11	9
Packing, Transport to Liverpool, Dock Charges	5	19	9
Freight on 55⅝ cub. ft. at 47s. 6d. and 10 per cent.	3	12	7
Marine Insurance on £900 at 1s. 10d. per cent.		16	6

		£	s.	d.
Total		£857	–	7
	= Fcs.	49364.88		
Landing Dues, Dock Charges, Transport in France	Fcs.	1174.80		
Total	Fcs.	50539.68		
Commission, 2½ per cent.	Fcs.	1263.49		
Total	Fcs.	51803.17		
Adding 2½ per cent. so as to allow 2½ per cent discount	Fcs.	1295.08		
Grand Total	Fcs.	53098.25		

52 yd. = 47·55 m. ; 51¼ yd. = 47·09 m. ; 51 yd. = 46·63 m.

Total length = 1418·22 m.

$$\therefore \text{ Cost per metre } = \text{Fcs. } \frac{53098.25}{1418.22} = \text{Fcs. } \mathbf{37.44}$$

48″ = 1⅓ × ·9144 m. = 1·22 m.

" FRANCO " INVOICE.

Invoice of 5 cases, Tweeds, sold by S. Purser & Co., Wakefield, to D.
Jacques & Cie., Grenoble, and shipped *via* Liverpool and Marseilles.

			Fcs.
D. J. & **Cie** **1/5**	5 cases containing— 30 pcs. 1·22 m. Tweeds, 18/47·55, 6/47·09, 6/46·63 = 1418·22 m. at Fcs. 37·44		53,098·16
		Discount 2½%	1,327.45
		Fcs.	51,770.71
	Wakefield, *9th April,* 19 . . *S Purser & Co.*		

Note 4.—In order to obtain the gross price such that in deducting 2½ per cent.
discount the net price becomes Fcs. 51,803.17, this quantity should be multiplied by
$\frac{100}{97\frac{1}{2}}$, but in actual practice an approximation would be made by adding on 2½%
of Fcs. 51,800.17.

Note 5.—The 2½% commission represents the profit of S. Purser & Co. by the
transaction. An importer quoting a price in order to receive an order should decide
what percentage profit he ought to obtain on his total outlay by the transaction,
and should add on this percentage to the gross cost.

TEST EXERCISES IV

(1) An importer purchased 450 bags of rice for £1,875 f.o.b. The gross
weight was 692 cwt. 1 qr. 18 lb., tare and draft 15 cwt. 3 qr. 6 lb. The
expenses of importation were as follows—

Freight, 72s. 6d. per ton of 20 cwt.
Marine Insurance on £2,400 at 4s. 3d. per cent.
Entries, Landing Dues, Dock Charges, £6 8s. 4d.
Cartage and Porterage, £2 11s. 3d.

What was the total cost by the time the rice was delivered at the importer's
warehouse ?

(2) Referring to Example (1), calculate the price per lb. (to nearest ⅛d.)
at which the importer should sell in order that he should gain 7½ per cent.
on his total outlay.

(3) Calculate the total of the expenses incurred in importing 60 cases of
a certain commodity, each case measuring 4 ft. 6 in. × 3 ft. 8 in. × 3 ft. 4 in.,
from the time the cases are placed on board at the foreign port to their arrival
at their destination—

Freight, 73s. 9d. per ton of 40 cub. ft. plus 10 per cent. primage.
Marine Insurance on £1,150 at 7s. 4d. per cent. plus 5 per cent.
Customs Entries, 3s. 6d.
Landing Dues, 1s. 10d. per case.
Opening for inspection by Customs officers, 6 cases at 2s. per case,
plus 20 per cent.
Delivery, 1s. 6d. per case.
Rent for warehousing, 4 weeks at 5d. per case per week.
Fire Insurance, 1 month, on £1,200 at 7s. 6d. per cent. per annum.
Cartage, 2s. 6d. per case.

(4) The goods referred to in example (3) were purchased by the importer at a f.o.b. price of £975. At what price should he deliver the goods to his customer's warehouse so as to gain 6 per cent. on his total outlay ?

(5) Make out an Account Sales of 120 half-chests Tea *ex* s.s. *Libia*, sold by Messrs. Sherwood & Co., Mincing Lane, for account of Messrs. Levi & Co., Colombo.

> 40 half-chests, net weight   2,396 lb. at 2s. 1½d.
> 50   ,,   ,,   ,,   2,995 ,,   2s. 1¼d.
> 30   ,,   ,,   ,,   1,796 ,,   2s. 1¾d.

Less 3 months' discount at 6 per cent. per annum.

> Charges—Entries, Dock Charges, and Rent, £14 14s. 8d.
> Import duty at 1s. 0d. per lb.
> Delivery, 2s. 3d. per half-chest.
> Brokerage, ½ per cent.
> Commission, 2½ per cent.

(6) 200 bales cotton were shipped on consignment at New York by G. Bradfield & Co., per s.s. *Albion*, and sent to W. Rossiter & Co., Liverpool. The gross weight was 646 cwt. 1 qr. 24 lb., tare 26 cwt. 2 qr. 10 lb. The consignee instructed a firm of brokers, R. Steer & Co., who sold the cotton as follows : Bales 1/120, gross weight 389 cwt. 1 qr. 20 lb., tare 15 cwt. 3 qr. 6 lb., at 1s. 5d. per lb. ; bales 121/200, gross weight 257 cwt. 4 lb., tare 10 cwt. 3 qr. 4 lb. at 1s. 5½d. per lb. The expenses were 100 samples at 8d., sale expenses 6d. per bale ; and the brokerage was ½ per cent.

The consignee's expenses were : Freight, £9 11s. 9d. per ton, plus 10 per cent. ; Insurance at 2s. 1d. per cent. on £5,000 ; Dock Dues and Delivery at 9d. per bale ; Warehousing at 1s. 3d. per ton ; Cartage, 8d. per bale ; and broker's expenses and charges as stated. Make out the account sales, allowing the consignee 2½ per cent. commission.

(7) 80 barrels coffee marked ⟦ W.S. ⟧ 1/80 were shipped per s.s. *Blake* from Java on consignment by W. Shult & Co., the consignee being B. Simons & Co., London. The latter instructed a broker, C. Hanley, to effect a sale. The coffee was sold as follows—

40 barrels 1/40, gross weight 79 cwt. 1 qr. 6 lb., net weight 77 cwt. 12 lb., at 212s. 6d. per cwt.

40 barrels 41/80, gross weight 79 cwt. 1 qr. 20 lb., net weight 77 cwt. 1 qr. 2 lb. at 214s. per cwt.

Broker's expenses were : 20 samples at 1s. 2d. ; sale expenses, 6d. per barrel ; and brokerage was at ⅝ per cent.

The charges paid by consignee in addition to the above : Freight, 136s. per ton of 20 cwt. ; Marine Insurance on £1,800 at 7s. 6d. per cent. ; Landing Dues, Entries, and Delivery, £16 2s. 8d. ; Import Duty at £2 2s. per cwt. ; Warehousing, £3 4s. 6d.

Make out the two Account Sales, the consignee's commission being 2½ per cent.

(8) The net proceeds of the sale of the cotton, Example (6), was 7 per cent. greater than the cost to G. Bradfield & Co. At what price in dollars per cental did the latter purchase the cotton, the exchange being £1 = $3.96 ?

(9) Make out an account sales for 100 hogsheads sugar, shipped by Messrs. Stamford & Co., Demerara, per s.s. *Caledonia* and sold by Messrs. Willis & Smith, Liverpool, as follows—

> 50 hogsheads, net weight   784 cwt. 1 qr. 20 lb. at 55s. per cwt.
> 40   ,,   ,,   ,,   627 cwt. 3 qr. 24 lb. ,,   56s. per cwt.
> 10   ,,   ,,   ;,   156 cwt. 3 qr. 6 lb. ,,   56s. 6d. per cwt.

The charges were : Freight and Insurance, £235 11s. 4d. ; Dock Dues, etc., £6 15s. 6d. ; Import Duty at 13s. 6·6d. per cwt. ; Cartage, £5 11s. 8d. ; Storage, £2 7s. 6d. ; Brokerage, ½ per cent. ; and Commission, 2¼ per cent.

(10) A foreign agent bought for Messrs. C. Murray & Co., Huddersfield, 30 bales of a certain commodity at £38 10s. per bale. The agent's expenses were : Cartage, £1 3s. 6d. ; Dock Charges, £5 1s. 6d. ; Freight at 76s. per ton of 20 cwt., plus 10 per cent., gross weight 33 cwt. 2 qr. 10 lb., tare 2 cwt. 2 qr. 24 lb. ; Insurance at 3s. 9d. on £1,200 ; Packing, £1 16s. 4d. ; Commission, 2¼ per cent.

Messrs. C. Murray & Co. employed a forwarding agent whose expenses were : Landing Dues, 1s. 8d. per bale ; Entries and Dock Charges, £7 4s. 3d. ; Transport, £3 12s. 8d. ; Commission, 1½ per cent. of value of goods on board at home port.

Calculate the total cost of the goods to Messrs. C. Murray & Co., and find by what percentage this was greater than the cost at the foreign market.

(11) Messrs. S. Handi & Co., Bombay, shipped to Messrs. H. Lingworth & Son., Liverpool, per s.s. *Calaba*, 180 bales cotton, against which they received on 10th April an advance of £2,000 from Messrs. Lingworth's bankers at Bombay. The cotton was sold at 7¼d. per lb., the weights being 715 cwt. 1 qr. 12 lb. gross, and 693 cwt. 3 qr. 20 lb. net. The charges were : Freight, £78 4s. 6d. ; Insurance, £2 3s. 6d. ; Cartage and Porterage, £6 1s. 9d. ; Storage, £3 12s. ; Brokerage, ½ per cent. ; and Commission, 2¼ per cent. The net proceeds were due 8th June.

Make out (1) an Account Sale ; (2) an Account Current, showing the balance 1st July, debiting and crediting interest at 5 per cent. per annum.

(12) From the following particulars, make out an Account Current to 31st December, debiting and crediting interest at 5 per cent. per annum—

Debit Items.		£	s.	d.	*Credit Items.*		£
July 24	To Invoice	546	11	4	Aug. 8	By Remittance	500
Sept. 10	,, ,,	716	19	2	Oct. 12	,, ,,	750
Nov. 17	,, ,,	296	7	9			

(13) Make out an Account Current to 30th June for the following transactions between D. Tenby & Co., Madras, and E. Franklin & Sons, London—

Dr.					*Cr.*		
Jan. 6,	To Goods,	£546 10s. 6d. credit 2 mths	By Draft due March 8th	. . .	£500
Feb. 14,	,,	,,	£284 1s. 3d. ,, 2 ,,	,, ,, ,, April 15th	. . .	£300
Apr. 30,	,,	,,	£646 13s. 10d. ,, 2 ,,	,, ,, ,, July 19th	. . .	£600

The balance on 31st December was *Dr.* £120 7s. 11d., and interest and discount was reckoned at 6 per cent. per annum.

(14) Show an Account Current ending 30th June, as made out by S. Walker & Co., London, who imports goods on consignment from L. Beyer & Co., Cape Town. Particulars of transactions are as follows, and interest and discount are reckoned at 5 per cent. per annum.

Debit Items.					£	*Credit Items.*				£	s.	d.
Jan. 17,	To 3 m/s dft. on us due Apr. 20	1,000	Jan. 1,	By Balance of last A/c.	135	10	4
Mar. 20,	,,	,,	,,	,, June 16	1,400	Jan. 8,	,, Account Sales	..	920	—	—
May 14,	,,	,,	,,	,, Aug. 4	2,200	Mar. 12,	,, ,, ,,	..	1,370	—	—
						May 7,	,, ,, ,,	..	2,160	—	—

(15) Referring to the example (14), make out the Account Current had the net proceeds of the Account Sales been due on 8th April, 12th June, and 7th August respectively.

(16) R. Norton & Co., London, carries on both import and export trade with A. Luigi & Co., Calcutta. Prepare an Account Current as made out by

R. Norton & Co. in respect of the following transactions, determining the balance on 30th September, reckoning interest and discount at 5 per cent. per annum.

			£	s.	d.
Debit Items.—July	2	To Invoice	348	10	4
,,	16	,, ,,	164	13	8
Aug.	5	,, 3 m/s dft. due Oct. 28th	250	–	–
Sept.	7	,, Invoice	500	–	–
,,	28	,, dft. due Nov. 2nd	400	–	–
Credit Items—July	10	By Account Sales, Jute	435	7	6
Aug.	2	,, ,, ,, Indigo	386	10	3
Sept.	13	,, Remittance due Oct. 30th	450	–	–
Sept.	27	,, Account Sales, Jute	397	9	3

(17) F. Lawson, London, sells goods for account of E. Shipley, New York. Net proceeds of Account Sales were as follows : 5th Jan., £836 *ex* 4·10 ; 23rd Jan., £950 *ex* 4·05 ; 10th Feb., £356 *ex* 4·02 ; 4th Mar., £472 *ex* 3·98 ; 25th Mar., £838 *ex* 3·92. Drafts were drawn on F. Lawson by E. Shipley as follows : $3,000 due March 2nd ; $3,600 due 18th March ; $1,500 due 4th April ; $1,800 due 30th April ; and $3,400 due 21st May. Prepare an Account Current as made out by F. Lawson, showing the balance (in dollars) on 30th April, reckoning interest and discount at 6 per cent. per annum.

(18) Using the Customs Tariff on pages 51-53, calculate the total import duty on 415 cwt. 1 qr. 21 lb. tea, 231 cwt. 3 qr. 15 lb. coffee, and 322 cwt. 2 qr. 6 lb. cocoa, all imported from British Colonies.

(19) Calculate the total import duty on 187 cwt. 1 qr. 7 lb. Cavendish tobacco, 472 lb. cigars (valued at £364 and imported from U.S.A.), 2,163 lb. cigarettes.

(20) What is the total import duty on

11 cwt. 2 qr. 18 lb. sugar, polarization 81¼°,	import duty at 14s. 9·4d. per cwt.
7 cwt. 1 qr. 12 lb. ,, ,, 87½°	,, ,, 17s. 6·6d. ,,
9 cwt. 3 qr. 5 lb. ,, ,, 95½°	,, ,, £1 2s. 4·5d. ,,

(21) The excise duty on beer of specific gravity 1055 (i.e. 55° of gravity) is £5 per barrel of 36 gall. Calculate the excise duty on 215 hogsheads of beer, specific gravity 1087. (Duty per barrel of 36 gall. = £5 × $\frac{87}{55}$.)

(22) What is the excise duty on 35 oz. (av.) 150 gr. of saccharin at 6s. 10½d. per ounce ?

(23) What is the Customs drawbacks on (1) 257 cwt. 1 qr. 20 lb. roasted coffee at £2 2s. per 100 lb. ? (2) 5,130 lb. cigarettes at 9s. 1d. per lb. ?

(24) C. Francis & Co. imported cocoa, 75 cwt. 2 qr. 12 lb. net, at a c.i.f. price of £9 13s. 6d. per cwt. The charges were : Import duty at five sixths of £2 2s. per cwt.; Insurance on £850 at 1s. 4½d. per cent. ; Dock Dues, Cartage, and Porterage, £19 3s. 10d. What must be C. Francis & Co.'s list price of cocoa per cwt. in order that after deducting 2½ per cent. cash discount he may gain 7¼ per cent. on his total outlay ?

(25) Express 184 cwt. 1 qr. 16 lb. in tonnes and centners (German) and 5 tonnes 14·4 centners in cwt. qr. lb. to nearest lb.

(26) Express 52 yd. 1 ft. 4 in. in ken (Japanese) and 47·38 ken in yd. ft. in.

(27) Convert 257 centners 38·4 punds (Danish) into kilograms.

(28) What is the weight of a sack of flour expressed in (1) ponds (Dutch) ; (2) okes (Egyptian) ?

(29) Draw up a double conversion table giving equivalent values in the case of centals (American) and centners (Danish). Use the table to express 5 short tons, 13 centals 56 lb. in centners and punds, and 75 centners 47 punds into centals and lbs.

(30) Find a multiplier for converting ardebs (wheat, Egyptian) per feddan, into bushels (60 lb.) per acre. Hence find the equivalent in bushels per acre of 6¾ ardebs per feddan.

(31) Given that £1 = 10·64 gulden (Dutch), find multipliers correct to 4 places of decimals, to convert (1) gulden per pond into shillings per lb. ; (2) gulden per el into shillings per yard ; (3) gulden per kan into shillings per gallon.

(32) Using the results of the previous example, express—

    (1) 1·45 gulden per pond into s. d. per lb.
    (2) 3·72 gulden per el into s. d. per yard.
    (3) 2·36 gulden per kan into s. d. per gallon.

(33) Given that £1 = 22·40 pesetas (Spanish) find multipliers correct to 4 places of decimals to convert (1) shillings per yard into pesetas per metro ; (2) £ per oz. (troy) into pesetas per gramo.

(34) Using the results of the previous question, express—

    (1) 15s. 9d. per yard into pesetas per metro.
    (2) £5 11s. 6d. per oz. (troy) into pesetas per gramo.

(35) A merchant purchased tanned skins at 5 rupees 12 annas per lb. The charges altogether amounted to 5 per cent. of the initial cost. At what price, in s. d., per lb. to nearest farthing should the merchant sell the skins in order to gain 7¼ per cent. on his total outlay ? (1 rupee = 1s. 4⅛d.)

(36) A London merchant purchased silk at 7·15 yen (Japanese) per ken. Given that 1 yen = 2s. 4¼d., calculate the price in s. d. per yard, at which the merchant should sell in order that he should gain 15 per cent. of the cost price.

(37) Given that £1 = 57·65 francs, draw up a table connecting 1, 2, . . . 9 pence per yard into prices 12½ per cent. higher expressed in francs per metre. Use the table to find prices in francs per metre which are 12½ per cent. greater than (1) 3s. 11d. per yard ; (2) 5s. 9½d. per yard ; (3) 11s. 3⅝d. per yard.

(38) Calculate the following in sterling—

    (1) Transport on 314 cwt. 1 qr. 25 lb. for 84 Km. at fcs. 0.42 per tonne per Km. (£1 = fcs. 56·70.)
    (2) Transport on 708 cwt. 3 qr. 6 lb. for 235 miles at $0·09 per short ton per mile. (£1 = $3·97½.)
    (3) Transport on 176 cwt. 2 qr. 11 lb. for 54·4 mijles at ·02 gulden per 100 ponds per mijle. (£1 = 10·64 gulden.)

(39) 100 motor cars were purchased *ex* New York at $1800·00 per car. The total expenses involved in delivering them to a firm in Madras amounted to $3,400·00 plus Rs. 1,347·0. At what price in rupees should each car be sold in order that a net profit of £1,200 should be made ? (£1 = $3·64, 1 rupee = 1s. 6⅛d.)

(40) The "loco" price at Leeds of serge was 18s. 6d. per yard. 2,500 yd. were exported to Simla, the total of charges amounting to £65 13s. 10d. plus Rs. 197. Given that 1 rupee = 1s. 6d., calculate the "franco" price at Simla if (1) the serge were exported direct by the manufacturer ; (2) the serge were purchased by a merchant who fixed his price so as to make a profit of 5 per cent. on his total outlay.

(41) An exporter purchased agricultural implements at Lincoln for £1 400. He exported them to Rouen, the charges being as follows : Packing, Cartage, and Dock Charges, £13 17s. 6d. ; Freight, £15 8s. ; Insurance, £1 7s. 6d. ; Landing Dues, Dock Charges, Transport in France, fcs. 372.50.

Calculate the net "franco" price, Rouen, assuming that the exporter gained 5 per cent. on his total outlay. (£1 = fcs. 62.43.)

(42) Draw up a foreign invoice for the following—

Stoke, 7th April, 19 . . Shipped per *City of Rochester*, by S. Smith & Co. to A. Robertson & Co., Hong-Kong.

3 cases, each containing 500 pieces porcelain ware, total £360, less discount at 1½ per cent.

Extend and add the following charges—

Packing, £1 7s. 6d. each case ; Carriage to Liverpool, £1 1s. 4d. ; Dock Charges, 3s. 10d. per case ; Freight, £12 3s. 4d. per ton of 40 cub. ft., plus 10 per cent., each case measuring 6 ft. 6 in. × 4 ft. 6 in. × 3 ft. 6 in. ; Marine Insurance on £450 at 4s. 3d. per cent.

Also draw up invoices (1) f.o.b. Liverpool ; (2) c.i.f. Hong-Kong, taking 1 Mexican dollar as being equivalent to 3s. 10½d.

(43) Make out in proper form an invoice for the following goods shipped by B. Fisher & Co., Nottingham, to Messrs. Hantz & Son, Cape Town, per s.s. *Kenilworth Castle*, from Tilbury—

1 case containing 2 doz. pairs curtains at £1 11s. 6d. per pair.
1 case   „   2 „ „   „   £2 4s. 9d. „
2 cases   „   12 pcs. cretonne, 6/48, 6/48½ at 4s. 11d. per yard.
Discount at 2½ per cent.

Charges : Packing, 8s. 6d. per case ; Cartage, 3s. 6d. per case ; Rail to Tilbury, 16s. 9d. ; Dock Charges, 7s. 10d. ; Freight at £7 14s. 6d. per ton, plus 10 per cent., of 40 cub. ft. each case measuring 4 ft. 6 in. × 3 ft 6 in. × 3 ft. 4 in. Insurance on £250 at 3s. 3d. per cent., plus 5 per cent.

(44) An indent was received by Messrs. Rodney & Co., commission merchants, London, from Messrs. Ansley & Co., Calcutta, for 360 pcs. 36″ casement cloth. The goods were bought at 3s. 7½d. per yard net, f.o.b. Liverpool, and

shipped in 30 cases marked | RODNEY, CALCUTTA. | 1/30 per s.s. *Manchester*. The

lengths of the pieces were : 160/48, 200/48½, and each case measured 4 ft. 6 in. × 4 ft. × 3 ft. 3 in. Freight was at £5 13s. 6d. per ton of 40 cub. ft., plus 10 per cent primage. ; Insurance on £3,500 at 6s. 3d. per cent., and Commission 2½ per cent.

Make out an invoice (1) on "loco" terms ; (2) c.i.f. Calcutta. (1 rupee = 1s. 10d.)

(45) Referring to Example (44), suppose that the casement cloth were bought as before but for account of S. Chantier & Cie., Le Havre. Freight, £1 18s. 3d. per ton, plus 10 per cent. ; Insurance at 3s. 4d. per cent. ; Commission, 3 per cent. Calculate the "franco" price in francs per metre and make out the "franco" invoice. (£1 = fcs 53·50.)

(46) Make out in proper form a "franco" invoice for the following goods, purchased and shipped by Messrs. S. Levi & Son, London, for account of Messrs. Funello & Matoel, Cadiz, per s.s. *Hispanian*, from London—

500 ready-made suits of various sizes and colours, contained in 50 cases measuring 4 ft. × 3 ft. 6 in. × 2 ft. 9 in.

The suits were purchased f.o.b. London at £3 13s. 9d. each, discount 1 per cent., and charges were as follows : Freight, £2 18s. 9d. per ton of 40 cub. ft., plus 10 per cent. ; Insurance on £1,500 at 4s. 3d. per cent., plus 5 per cent. ; Dock Charges and Cartage at Cadiz, 235·50 pesetas ; Commission, 2½ per cent. Exchange was £1 = 22·38 pesetas. Give the "franco" price per suit to the nearest centimo.

CHAPTER V.

27. BRITISH COINS.

By the **Currency Law of 1816,** the gold standard of Great Britain was fixed as the **Pound Sterling.** In the British Isles, coin is made at the London Mint ; but coins of the British system of currency are also minted at Sydney, Melbourne, and Perth in Australia, and at Ottawa in Canada.

Standard gold is $\frac{11}{12}$ fine (or 22 carat), that is, it contains 11 parts of pure gold to 1 part of alloy, the value of which, compared with that of the gold, is negligible. 40 lb. troy of standard gold is made into 1,869 sovereigns, and thus the standard weight of a sovereign is $\dfrac{5760 \times 40}{1869}$ grains (i.e. 123·27447 grains) and that of a half-sovereign 61·63723 grains.

Margins (called the **remedy of weight**) of 0·2 grain and 0·15 grain are allowed over or below the standard weights of a sovereign and half-sovereign respectively. Thus, sovereigns weighing over 123·47447 grains or under 123·07447 grains would not be issued by the Mint, but would be melted down for the manufacture of fresh coins. The **least current weights** of the sovereign and half-sovereign are 122·500 grains and 61·125 grains respectively. Light gold (i.e. sovereigns and half-sovereigns below the least current weight) are from time to time returned to the Mint and full value is allowed.

The Mint Price of Gold is £3 17s. 10½d. per ounce troy of standard gold. As the market price of gold has increased to a considerable amount above the mint price, no gold coins have been made at the London Mint since 1917, but the Mints in Australia and Canada have continued to issue a limited amount of gold coin.

Standard silver consists of $\frac{37}{40}$ of fine silver and $\frac{3}{40}$ of alloy. Formerly, British silver coins were composed of standard silver, but by the **Coinage Act, 1920,** silver coins minted after this date consist of one-half silver and one-half alloy. No Crowns have been coined since 1902 and no Double Florins since 1890. Silver is not bought at a fixed price, as in the case of gold, but at the market price, which is subject to variation. In 1914 the

average price of standard silver was 25$\frac{5}{16}$d. per ounce troy, but in 1919 it reached 70d. per ounce troy.

One pound troy of silver is coined into 66 shillings.

The weight and the "remedy" in the case of each silver coin are as follows—

Coin.	Standard Weight.	Remedy.	Coin.	Standard Weight.	Remedy.
	Grains.	Grains.		Grains.	Grains.
Half-crown	218·18182	1·264	Shilling	87·27273	0·578
Florin	174·54545	0·997	Sixpence	43·63636	0·346
			3d. piece	21·81818	0·212

Bronze is an alloy of copper, 95 parts ; tin, 4 parts ; and zinc, 1 part. Particulars of the bronze coins are as follows—

Coin.	Standard Weight.	Remedy.
	Grams.	Grains.
Penny	145·83333	2·91666
Halfpenny	87·50000	1·75000
Farthing	43·75000	0·87500

The legal weight of a penny is $\frac{1}{3}$ oz. Av. ; a halfpenny, $\frac{1}{6}$ oz. Av. ; and a farthing $\frac{1}{10}$ oz. Av. The diameter of a halfpenny is 1 inch.

All British coins except the gold ones are **token coins**, that is, they are not intrinsically worth the amount they represent. On account of the high prices (due to the war) of precious metals, the intrinsic values based on market prices values of gold and silver coins have exceeded the representative values, consequently, the melting of British gold and silver coins, and their export, are prohibited.

Gold coin, if not below the least current weight, is **legal tender** to any amount ; but silver is not a legal tender for sums over £2, nor bronze for sums over 1s.

Imperial sterling coins are the sole legal metallic currency in South Africa, New Zealand, Gibraltar, Falkland Islands, Fiji, and St. Helena.

The only gold coin in general use in Egypt is the British sovereign, which is current at 97$\frac{1}{2}$ piastres.

28. PAPER MONEY.

Postage stamps can be used for payment up to 1s.

Postal Orders are issued and paid in nearly all parts of the British Empire. They are issued for every 6d. up to 20s., and for 21s. ; those of 6d., 1s., etc., up to 2s. 6d. at a charge of 1d. ; those for 3s.,

etc., up to 15s., at a charge of 1½d. ; and those for 15s. 6d., etc., up to 21s., at a charge of 2d. They must be presented for payment within 3 months from the last day of the month of issue, or a fresh commission will be charged.

Inland Ordinary Money Orders can be obtained after a form stating (1) the name of the payee, (2) the name of the office at which payment is to be made, (3) the amount to be paid, and (4) the name and address of the sender, has been filled in. The poundage charged is, for sums not exceeding £3, 4d. ; £10, 6d. ; £20, 8d. ; £30, 10d. ; £40 (maximum), 1s.

Inland Telegraph Money Orders may be transmitted from any Money Order Office which also dispatches telegrams, and may be made payable at any Money Order Office which also delivers telegrams. Poundage is at the same rate as for Ordinary Inland Money Orders, plus 2d., plus cost of official Telegram of Advice.

Payment may be made abroad by **Ordinary Money Orders Abroad** and by **Telegraph Money Orders Abroad.**

Bank of England Notes are issued for sums of £5, £10, £20, £50, £100, £200, £500, and £1,000. The tender of Bank of England Notes is legal in England and Wales for every purpose, but no one can be compelled to give change.

Treasury Notes of the value of £1 and 10s. are issued and are legal tender to any amount.

EXAMPLE (i)—

Calculate the weight of fine gold in 1 sovereign. Also calculate the price per ounce troy of fine gold. Hence, verify that a sovereign contains £1 worth of fine gold.

Weight of fine gold in 1 sovereign	$= \frac{11}{12} \times 123 \cdot 27447$ gr.
	$= 113 \cdot 0016$ gr.
Price per oz. troy of fine gold	$= £3$ 17s. 10½d. $\times \frac{12}{11}$
	$= £4$ 4s. 11½d. to nearest ¼d.
∴ Value of fine gold in 1 sovereign	$= £\dfrac{113 \cdot 0016 \times 4 \cdot 248}{480}$
	$= £1 \cdot 000$ correct to 3 places of dec.

EXAMPLE (ii)—

Calculate the value of silver, when silver is at 69d. per standard oz. troy, contained by a florin of standard weight of fineness (1) $\frac{37}{40}$, (2) $\frac{1}{2}$.

Intrinsic value of 1 florin, fineness $\frac{37}{40}$	$= \frac{11}{12} \times 69$ pence
	$= 2$s. $1\frac{1}{4}$d.
Intrinsic value of 1 florin, fineness $\frac{1}{2}$	$= \frac{11}{12} \times 69 \times \frac{40}{37} \times \frac{1}{2}$ pence
	$= 1$s. $1 \cdot 56$d.

In the United States, the price of silver is quoted in cents per troy oz. fine.

EXAMPLE (iii)—

Find multipliers to convert prices of silver from (1) pence per standard troy oz. to cents per troy oz. fine ; and (2) cents per troy oz. fine to pence per standard troy oz, given that £1 = 4·867 dollars.

$$1 \text{ cent per troy oz. fine} = \frac{240}{486·7} \text{ pence per } \tfrac{37}{40} \text{ standard troy oz.}$$

$$= \frac{240 \times 37}{486·7 \times 40} \text{ pence per standard troy oz.}$$

$$= ·4561 \text{ pence per standard troy oz.}$$

$$1\text{d. per standard troy oz.} = \frac{1}{·4561} \text{ cents per troy oz. fine}$$

$$= 2·192 \text{ cents per troy oz. fine}$$

29. COINAGE OF FOREIGN COUNTRIES.

Certain countries, including the United States and the countries incorporated in the Latin Monetary Union, have a double standard based on gold and on silver. In these countries the Mint price of silver as well as that of gold, is fixed, and thus the silver coins are not token coins.

In the French system, gold coins to the value of 3,100 francs are struck from a kilogram of gold $\frac{9}{10}$ fine ; the silver standard is the franc, which weighs 5 grams, of which amount $83\frac{1}{2}$ per cent. is fine silver. France, Belgium, Switzerland, Italy, Spain, Roumania, Serbia, Greece, and Bulgaria use this system of currency : the corresponding gold and silver coins, although having different names and designs, yet possess the same fineness, weight, and diameter.

The United States has a gold dollar and a silver dollar. The weight of the gold dollar is 25·8 grains, and is composed of gold $\frac{9}{10}$ fine. The silver dollar weighs 412·5 grains and consists of silver $\frac{9}{10}$ fine.

The monetary unit of Canada, Newfoundland, and British Honduras is the dollar on the gold basis. The gold coins in circulation in Canada and Newfoundland are Canadian 10 and 5 dollar pieces, United States 10 and 5 dollar pieces, and the sovereign and half-sovereign.

The Mint Par of Exchange is the rate of exchange existing between the pound sterling and the monetary units of any foreign country obtained by comparison of the amount of fine gold in the former

with that in the latter. For example : the weight of pure gold
in a 10 franc piece is

$$\frac{1000}{310} \times \frac{9}{10} \text{ gm.} = \frac{90}{31} \times \cdot 03215 \text{ oz. troy ;}$$

and in 1 sovereign,

$$\frac{40 \times 12}{1869} \times \frac{11}{12} \text{ oz. troy :}$$

therefore

$$\pounds 1 = \frac{40 \times 12 \times 11}{1869 \times 12} \times \frac{31}{9 \times \cdot 03215} \text{ francs} = 25 \cdot 22 \text{ francs.}$$

The nominal par of exchange between two countries, one having a gold
standard and the other a silver standard, is based on the supposition that
15½ parts by weight of silver are equivalent to one of these parts of gold,
but the current rates of exchange are generally based on the market value
of the weight of silver contained in the standard coins of the silver-using
country.

The currency systems of many nations are dislocated as a consequence
of the war.

The table shown on page 75 gives particulars of the coinage systems of
certain countries.

30. SPECIE POINTS.

Before the war it was possible for merchants to remit money
from one country to another by sending specie or bullion. For
example : the cost of insurance and freight to send £100 in specie
to Paris was 10 francs, so that, the par rate of exchange being
£100 = fcs. 2522·50, the gold exporting point was 25·32½. Similarly,
the gold-importing point was 25·12½.   The differences between the
par rates and the specie points were greater in the case of countries
a long distance away.   The specie points themselves were subject
to slight variations, according to variations in the cost of insurance
and freight.   The usual method of remitting money abroad is by
bills of exchange, but as the above method was possible, the effect
was to keep the rates of exchange being the par rates of exchange
plus insurance and freight of specie and the par rates of exchange less
insurance and freight of specie ; that is, between the specie points.
Thus, only comparatively small variations in the rates of exchange
were possible.

Since the beginning of the war, gold has no longer been in circula-
tion, import and export of specie and bullion by merchants has
been prohibited, and currency notes in most countries have not

Country.	Monetary Unit.	Par Exchange.			Gold Coins.	Silver Coins.
		s.	d.	NUMBER TO £1		
British Empire						
Canada	Dollar (= 100 Cents)	4	1¼	4·867	10 and 5 dollars, £1, 10s.	1 dollar; 50, 25, 10, 5 cents.
India	Rupee (= 16 Annas = 64 Pice)	1	4	15	British and 15 rupees	½, ¼, ⅛ rupee (nickel)
Egypt	Pound of 100 Piastres	20	3¾	97½ piastres	British	20, 10, 5, 2 piastres
Europe—						
Belgium	Franc (= 100 Centimes)				20 francs	5, 2, 1 francs
Bulgaria	Lev (= 100 Slotinski)				100, 20, 10 leva	5, 2, 1 leva ; 50 stotinski
Finland	Markka (= 100 Penni)				20, 10 markkaa	2, 1 markkaa ; 50, 25 pennia
France	Franc (= 100 Centimes)	0	9·513	25·225	20, 10 francs	5, 2, 1 francs ; 50, 20 centimes
Greece	Drachma (= 100 Lepta)				20, 10, 5 drachmae	5, 2, 1 drachmae; 50, 20 lepta
Italy	Lira (= 100 Centesimi)				100, 50, 20, 10, 5 lire	5, 2, 1 lire ; 50 centesimi
Luxemburg	Franc (= 80 Pfennige)					
Roumania	Leu (= 100 Bani)				100, 50, 25, 20, 12½, 10 lei	5, 2, 1 lei ; 50 bani
Serbia	Dinar (= 100 Paras)				20, 10 dinars	5, 2, 1 dinars ; 50 paras
Spain	Peseta (= 100 Centimos)	1	1¾	17·78	100, 50, 20, 10, 5 pesetas	5, 2, 1 pesetas; 50, 20 centimos
Switzerland	Franc (= 100 Centimes)				20, 10 francs	5, 2, 1 francs; 50 centimes
Austria-Hungary	Krone (= 100 Heller)	0	10	24	100, 20, 10 kronen	2, 1 kronen
Denmark	Krone (= 100 Ore)	1	1¾	17·78	20, 10 kroner	2, 1 kroner; 25, 10 ore
German States	Mark (= 100 Pfennige)	0	11·748	20·43	20, 10 mark	5, 3, 2, 1 mark; 50 pfennige
Netherlands	Florin or Gulden (= 100 Cents)	1	7·824	12·11	10, 5 florins	2½, 1, ½ florins ; 25, 10 cents
Norway	Krone (= 100 Ore)	1	1¾	17·78	20, 10, 5 kroner	2, 1 kroner ; 50, 25, 10 ore
Portugal	Escudo (= 1,000 Centavos)	4	5¼	4·51	1, ½, ⅖, ⅒ escudo	1 milreis; 5, 2, 1, ½ teston
Russia	Rouble (= 100 Kopecks)	2	1¾	9·47	15, 10, 7½, 5 roubles	1 rouble; 50, 25, 20, 15, 10, 5 kopecks
Sweden	Krona (= 100 Ore)	1	1¾	17·78	20, 10, 5 kronor	2, 1 kronor; 50, 25, 10 ore
Turkey	Lira (= 100 Piastres)	18	0	111½ piastres	500, 250, 100, 50, 25 piastres	20, 10, 5, 2, 1½ piastres
America—						
United States	Dollar (= 100 Cents)	4	1·32	4·867	20, 10, 5, 2½, 1 dollars	1, ½, ¼ dollar ; 1 dime
Mexico	Dollar (= 100 Centavos)	2	0½	9·80	10, 5 dollars	1 dollar ; 50, 20, 10 centavos
Brazil	Milreis (= 1,000 Reis)	2	3	8⅜	20, 10 milreis	2, 1 milreis ; 500 reis
Chile	Peso (= 100 Centavos)	1	6	13⅜	20, 10, 5 pesos	1 peso ; 20, 10, 5 centavos
Peru	Libra (= 10 Soles = 100 Dineros)	20	0	1	1, ½, ⅕ libra	1, ½, ⅕ sol ; 1, ½ dinero ; 20, 10, 5 centavos
China	Yuan or Dollar (= 100 Cents)	Varies with price of silver (2s. 6d. when silver 69d. oz.)		—	—	1 yuan ; 50, 25, 10 cents
Asia—						
Japan	Yen (= 100 Sen)	2	0½	9·80	20, 10, 5 yen	50, 20, 10 sen
Siam	Tical (= 100 Satangs)	1	6¼	12·97	1 dos (= 10 ticals)	1, ½, ¼ tical
Africa—						
Algeria						
Madagascar	Franc (= 100 Centimes)	0	9·513	25·225	20, 10 francs	5, 2, 1 francs; 50, 20 centimes
Tunis						
Morocco	Piastre (= 5 Francs)	3	0	6¼	—	1, ½, ¼ piastre
Tripoli	Lira (= 100 Centesimi)	0	9·513	25·225	100, 50, 20, 10, 5 lire	5, 2, 1 lire ; 50 centesimi

been backed up by gold. Consequently, the current rates of exchange have increased or diminished far beyond the limits determined by the specie points. For example : a man travelling to Italy could, in April, 1920, exchange £1 currency note for Italian currency notes to the value of nearly 100 lire, but he could not change the latter for Italian gold coin.

EXAMPLE (iv)—

From the data given in Article 28, calculate the ratio of the value of gold to that of an equal weight of silver, with respect to the French coinage system, (1) gold $\frac{9}{10}$ fine, silver $\frac{83\frac{1}{2}}{100}$ fine ; (2) fine gold, fine silver.

(1) Value of 1 Kgm. of gold, $\frac{9}{10}$ fine   = 3,100 francs

Value of 1 Kgm. of silver, $\frac{83\frac{1}{2}}{100}$ fine = 200 francs

∴ Ratio is $15\frac{1}{2} : 1$

(2) Value of 1 Kgm. of fine gold   = $3{,}100 \times \frac{10}{9}$ francs

Value of 1 Kgm. of fine silver   = $200 \times \frac{100}{83\frac{1}{2}}$ francs

∴ Ratio is $\frac{310}{9} \times \frac{167}{400}$ i.e. $14{\cdot}38 : 1$

EXAMPLE (v)—

Calculate the weight in grams of fine gold in the Swedish 20 kronor piece.

Value of gold in a 20 kronor piece   = $£\frac{20 \times 9}{8 \times 20} = £\frac{9}{8}$

∴ Weight of fine gold in a 20 kronor piece = $\frac{9}{8} \times 123{\cdot}27447 \times 1\frac{1}{2}$ gr.

$$= \frac{9 \times 123{\cdot}27447 \times 11}{8 \times 12} \times {\cdot}0648 \text{ gm.}$$

$$= 8{\cdot}2378 \text{ gm.}$$

EXAMPLE (vi)—

Calculate the par exchange between pesetas and dollars, expressing 1 dollar in pesetas and 1 peseta in dollars.

4·867 dollars   = 25·225 pesetas

∴ 1 dollar   = $\frac{25{\cdot}225}{4{\cdot}867}$ pesetas = 5·183 pesetas

and 1 peseta   = $\frac{4{\cdot}867}{25{\cdot}225}$ dollar = ·193 dollar.

TEST EXERCISES V

(1) What is the intrinsic value of a sovereign when the market price of standard gold is 103s. 7d. per oz. troy ?

(2) What is the intrinsic value of a light sovereign weighing 121·87 gr. when standard gold is at 104s. 0¼d. per oz. troy ?

(3) How many sovereigns could be made using 4,513 oz. 17 dwt. 14 gr. of standard gold ?

(4) What is the value of 12 oz. troy 11 dwt. 13·54 gr. of standard gold at (1) the Mint price, (2) 104s. 1¼d. per oz. troy ?

(5) How many sixpences composed of silver of fineness ½ could be coined using 1 ton of standard silver ?

(6) Referring to the previous question, calculate the gain in value to the nearest shilling when standard silver is at 68¾d. per oz. troy.

(7) What is the percentage depreciation of the intrinsic value of a sovereign when at the least current weight ?

(8) If 1,000 shillings, composed of standard silver and having an average weight of 82·6734 gr., be melted down, and the silver used for coining shillings of fineness ½, how many of the latter could be made ?

(9) What weight in oz. troy, dwt., gr. of standard gold would be worth £1,000 at the Mint price ?

(10) What is the value of 236 oz. troy 11 dwt. 6 gr. of 9 carat gold at 103s. 11⅜d. per standard oz. troy ?

(11) What is the intrinsic value of a half-crown dated 1918 and weighing 216·9834 gr. when standard silver is at 69d. per oz. troy ?

(12) What is the intrinsic value of a new half-crown, weight 216·9834 gr., when standard silver is at 69d. per oz. troy ?

(13) How many pennies could be coined using 1 cwt. of bronze ?

(14) One ton of bronze is used in coining equal numbers of pennies, halfpennies, and farthings. What is the currency value of the coins ?

(15) In 1917, the London Mint issued gold coins to the value of £1,014,000. What was the approximate weight of standard gold used in their manufacture ?

(16) In 1918, silver coins to the nominal value of £8,885,384 were issued in the British Empire. The average price of silver during 1918 was 47⅝d. per standard troy ounce. By how much was the nominal value greater than the intrinsic value ?

(17) Express 68¼d. per oz. troy of silver ³⁷⁄₄₀ fine in dollars and cents per oz. troy of fine silver, and $1·28 per oz. troy of fine silver in pence per oz. troy of standard value (1) at the Mint par rate of exchange ; (2) at the exchange £1 = $3·96.

(18) (a) Calculate the United States Mint price of fine silver. (b) Calculate the French Mint price of silver, $\frac{83\frac{1}{2}}{100}$ fine.

(19) Express each of the results in the Example (18) into pence per oz. troy of silver, ³⁷⁄₄₀ fine.

(20) Calculate the ratio of the value of gold, ₁₀⁹⁄₁₀ fine to that of an equal weight of silver ₁₀⁹⁄₁₀ fine, with respect to the United States system of coinage.

(21) What is the weight in oz. troy of fine silver in the Chinese dollar, given that the Mint par value is 2s. 6d. when standard silver is at 69d. per oz. troy ?

(22) What is the approximate weight in gm. of fine gold in a 10 florin piece (Dutch) ?

(23) What is the Mint par rate of exchange between : (1) dollars and marks ; (2) marks and drachmae ; (3) yen and gulden ?

(24) At the Mint par rate of exchange, express : (1) £37 5s. in Mexican dollars ; (2) 1 lira 55 piastres in £ s. d.

(25) At the Mint par rate of exchange, express : (1) $237·40 in francs and centimes ; (2) 54 ticals 75 satangs in kroner and öre ; (3) 538 lire 60 centesimi in yen and sen.

CHAPTER VI

31. CHEQUES AND PROMISSORY NOTES.

A **Cheque** is an order written by a person, having a current account at a bank, to his banker, and it orders the latter to pay a specified sum of money either to a person named or to his " order," or to the " bearer." To be valid, a cheque must bear a 2d. stamp. The **drawer** is the person who draws the cheque, the **drawee** is the bank on whom it is drawn, and the **payee** is the person to whom it is payable.

Cheques are payable on demand, that is, at the time of presentation to the drawee.

A cheque to **bearer** is paid to anyone presenting the cheque, but a cheque to **order** will only be paid if the payee has indorsed the cheque. The **indorser**, by simply signing his name on the back of the cheque, makes a blank indorsement, and then the cheque can be passed from hand to hand without further indorsement, and any holder of the cheque can bank or cash the same. Should the indorser write " Pay X Y or order," immediately before his signature, then X Y would become the payee, and he would have to indorse the cheque before it could be paid. Although a cheque is not legal tender, there is seldom any difficulty in having it accepted as payment.

If a cheque be **crossed,** the drawee will pay the amount only to a bank, so that the payee could not receive cash on presenting the cheque. The latter could, however, pay it into his own bank : his account would be credited with the amount and the bank would receive payment from the drawee at the time settlement is made at the **Bankers' Clearing House.**

A **Promissory Note** is a promise in writing made by one person to another, signed by the maker, engaging to pay on demand or at a specified time, a sum of money to or to the order of a specified person (the payee), or to bearer. When properly stamped (as per

inland bill of exchange not payable on demand) and indorsed, it can be used as a negotiable instrument.

An **I O U** is not a negotiable instrument.

32. BILLS OF EXCHANGE.

A Bill of Exchange is legally defined as : " An unconditional order in writing, addressed by one person to another, signed by the person giving it, requiring the person to whom it is addressed to pay on demand, or at a fixed or determinable future time, a sum certain in money to or to the order of a specified person or to bearer."

A bill both drawn and payable in the British Isles, or drawn in the British Isles upon some person resident therein, is an **Inland Bill.** Any other bill is a **Foreign Bill.** All bills should be dated at the time they are drawn.

The drawer is the person who writes out and signs the bill ; the drawee is the person on whom it is drawn ; and the payee (who may be the drawer himself) is the person to whom, or at whose order, the money is payable.

Bills for any amount, inland and foreign, payable on demand or within three days after date or sight, must bear a 2d. stamp. Bills of exchange, not payable on demand or within three days, must bear stamps to a value easily estimated from the following—

Inland.	s.	d.	*Foreign.*	s.	d.
Not exceeding £10	–	2	Not exceeding £10	–	2
Excg. £10 and not excg. £25	–	3	Excg. £10 and not excg. £25	–	3
,, £25 ,, ,, £50	–	6	,, £25 ,, ,, £100	–	6
,, £50 ,, ,, £75	–	9	Every £100 or fractional		
,, £75 ,, ,, £100	1	–	part	–	6
Every £100 or fractional part	1	0			

Bills not drawn on demand are made payable at so many days or months after date or sight. These bills are sent to the drawee for **acceptance,** and the drawee accepts the bill by writing across it the word " **accepted,**" and the name of the bank where payment can be received. Unaccepted bills have no value. In the case of bills made payable a certain time after **sight,** the date of sight (i.e. the date when the drawee first sees the bill) must be stated in the acceptance.

After accepting the bill, the drawee is called the **acceptor** and the bill is called an **acceptance.** If the bill in the meantime has not been negotiated the acceptance is sent to the payee.

Acceptances payable to bearer can be transferred from one person to another without indorsement, but those payable to " order " must be indorsed by the payee before they become transferable. These indorsements are similar to those in the case of cheques payable to " order," and thus bills can be passed from person to person as payment. An indorser, unless he indorses " without recourse to me," is liable to be called upon to pay the amount to any subsequent indorser in the event of the acceptor failing to pay the bill at maturity.

Bill Brokers are those who buy and sell bills of exchange. They perform an extremely valuable service in the carrying on of international trade ; for merchants wishing to remit to foreign countries are able to buy from bill brokers bills of exchange drawn on the places in question. Thus, the transfer of bullion and specie between foreign countries is reduced to a minimum.

Usance is the name given to the customary period of time at which bills are drawn at or on certain places. The usance in the case of some important towns is as follows : Berlin and Vienna, 14 days' sight (14 d/s.) ; Paris, Geneva, and Lisbon, 30 days' date (30 d/d.) ; Amsterdam, Rotterdam, and Antwerp, 1 month's date (1 m/d.) ; New York, 60 days' sight (60 d/s.) ; Madrid, 2 months' sight (2 m/s.) ; Cadiz, 60 days' date (60 d/d.) ; Genoa, Milan, Naples, and Venice, 3 months' date (3 m/d.) ; Melbourne and Sydney, 30, 60, or 90 days' sight.

Cheques, of course, are payable on demand.

In the United Kingdom, bills are payable on demand under the following circumstances—

I. When bills are expressed to be payable on demand.

II. When no time of payment is expressed.

III. When an overdue bill is accepted or indorsed, it is deemed payable on demand, so far as regards the acceptor or indorser.

A bill is payable at a determinable future time within the meaning of the law, which is expressed to be payable at a fixed period after date or sight.

Three days of grace are, where the bill does not otherwise provide, added to the time of payment fixed by the bill and the bill is payable on the last day of grace unless—

(a) The last day of grace falls on a Sunday, Christmas Day, Good Friday, or a public fast or thanksgiving day, in which case the bill is, with the following exception, payable on the preceding business day.

(b) The last day of grace is (1) a Bank Holiday other than Christmas Day or Good Friday, or (2) a Sunday and the second day of grace a Bank Holiday, in which case the bill is payable on the succeeding business day.

The number of days of grace is different in different countries : in New York State, and in many European countries, none is allowed.

EXAMPLE (i)—

A bill was drawn on London and dated 2nd March, 1920. Calculate the due date of maturity of the bill, the term being (1) on demand ; (2) 30 d/d. ;

(3) 1 m/d. If the bill had been seen and accepted on 8th March, what would have been the due date had the term been (4) 30 d/s. ; (5) 1 m/s. ?

(1) The bill must be paid on whatever date it be presented for payment.

(2) The last day of grace fell on 4th April, which was a Sunday, and so the due date was Saturday, 3rd April.

(3) The last day of grace fell on 5th April, which was Easter Monday, and so the due date was Tuesday, 6th April.

(4) The last day of grace would have fallen on Saturday, 10th April, which would have been the due date for payment.

(5) The last day of grace would have fallen on Sunday, 11th April, and so the due date would have been Saturday, 10th April.

33. BANKING.

The business carried on by banks consists of : (1) Receiving deposits at interest ; (2) advancing money on securities ; (3) keeping current accounts of customers ; (4) discounting and negotiating bills of exchange ; (5) remitting money for customers ; (6) storing valuable articles and documents for customers.

Money can be deposited for a fixed term or on condition that a certain number of days' notice be given. The longer the notice, the higher, as a rule, is the rate of interest allowed. As a rule, banks will advance money only on security ; for example, deeds, valuable articles, bills of exchange, and the rate of interest charged is somewhat higher than that allowed on money deposited. Most loans are made to brokers, and the rate of interest charged is greater for weekly loans than for daily loans.

The **Bank Rate** is the official minimum rate per cent. charged by the Bank of England in discounting bills of exchange having first-class security. The rate of discount charged by other banks approximates to the Bank Rate. The rates of interest and discount quoted in a newspaper dated 21st April, 1920, were—

LOANS, PER CENT.		DISCOUNT PER CENT. (BANK RATE, 7%).					
		Bank Bills.				Fine Trade Bills.	
Day-to-day.	Short Periods	2 months.	3 months.	4 months.	6 months.	3 months.	6 months.
3 – 5	5¼	5¾	6½ – ⅝	6⅝ – ¾	6¾ – ⅞	7	7¼

The **Post Office Savings Bank** pays interest at the rate of 2½ per cent. per annum, payable at the end of each year, or when the account is closed, on completed £'s, but only if the money has stood to the credit of the depositor during a complete calendar month. Thus, the interest is ½d. per complete £ per complete calendar month ; for example, £1 19s. deposited 1st April and withdrawn the following 31st May would bear no interest, whereas if deposited 31st March and withdrawn 1st June the interest would be on £1 for 2 months, that is, 1d.

Interest Tables are in common use in many offices for the purpose of quickly obtaining the interest on certain sums of money when the time and rate are given. The following portions of the simple interest and the compound interest tables will be sufficient to enable the methods of using the tables to be understood—

INTEREST ON £100 AT 3%, 4%, 5%, AND 6% PER ANNUM FOR GIVEN NUMBERS OF DAYS.

Days.	3% s. d.	4% s. d.	5% s. d.	6% s. d.	Days.	3% s. d.	4% s. d.	5% s. d.	6% s. d.
1	− 2	− 2¼	− 3¼	− 4	7	1 1¾	1 6½	1 11	2 3¾
2	− 4	− 5¼	− 6½	− 8	8	1 3¼	1 9	2 2¼	2 7¼
3	− 6	− 8	− 10	− 11½	9	1 5¼	1 11½	2 5½	2 11½
4	− 8	− 10¼	1 1½	1 3¾	10	1 7¼	2 2¼	2 9	3 3¼
5	− 10	1 1¼	1 4½	1 7½	11	1 9¼	2 5	3 −¼	3 7½
6	− 11¾	1 3¾	1 7¼	1 11¾	12	1 11¾	2 7½	3 3½	3 11¼

NOTE 1.—The amounts given are correct to the nearest ¼d. and thus the table could be used to find the simple interest on sums up to £400, to the nearest penny. The interest at 1%, ½%, ¼%, ⅛% can be obtained by dividing the sums in the 4% column by 4, 8, 16, 32 respectively.

AMOUNT OF 1 UNIT OF MONEY AT 2½%, 3%, 3½%, 4%, 4½%, 5% PAYABLE YEARLY FOR GIVEN NUMBER OF YEARS.

Years.	2½%	3%	3½%	4%	4½%	5%
1	1·025000	1·030000	1·035000	1·040000	1·045000	1·050000
2	1·050625	1·060900	1·071225	1·081600	1·092025	1·102500
3	1·076890	1·092727	1·108718	1·124864	1·141166	1·157625
4	1·103812	1·125509	1·147524	1·169859	1·192518	1·215506
5	1·131407	1·159273	1·187688	1·216653	1·246181	1·276281
6	1·159692	1·194051	1·229256	1·265319	1·302259	1·340095
7	1·188684	1·229873	1·272280	1·315932	1·360860	1·407100
8	1·218401	1·266771	1·316809	1·368569	1·422006	1·477455
9	1·248861	1·304774	1·362897	1·423311	1·486092	1·551328
10	1·280083	1·343913	1·410598	1·480243	1·552966	1·628894
11	1·312085	1·384231	1·459969	1·539453	1·622850	1·710339
12	1·344889	1·425758	1·511068	1·601031	1·695878	1·795856
13	1·378511	1·468531	1·563955	1·665072	1·772192	1·885649
14	1·412974	1·512587	1·618694	1·731675	1·851941	1·979931
15	1·448298	1·557965	1·675348	1·800942	1·935279	2·078928
16	1·484505	1·604708	1·733985	1·872980	2·022366	2·182874
17	1·521618	1·652849	1·794674	1·947899	2·113372	2·292018
18	1·559658	1·702434	1·857487	2·025815	2·208474	2·406619
19	1·598649	1·753507	1·922498	2·106847	2·307855	2·526950
20	1·638615	1·806113	1·989785	2·191121	2·411708	2·653298

NOTE 2.—The above table applies equally well if the unit of money be a pound sterling, shilling, franc, dollar, etc. The table can be used inversely; for example, the sum that will amount to £400 in 12 years' time at 4% per annum compound interest is £ $\frac{400}{1·601031}$.

EXAMPLE (ii)—

A person had, including interest, the sum of £45 7s. 4d. deposited in the Post Office Savings Bank at the end of 1918. During 1919 his deposits were £5 on 14th February, £1 14s. 10d. on 6th May, £2 8s. 3d. on 24th June, and £4 10s. on 10th November. His withdrawals were £10 on 20th March, £5 on 7th August, and £8 on 2nd October. What interest was he entitled to receive at the end of 1919 ?

The minimum numbers of complete £'s standing to the depositor's credit each month were 45, 45, 40, 40, 40, 42, 44, 39, 39, 31, 31, 36 respectively.

$$\therefore \text{ Total interest } = 472 \times \tfrac{1}{2} \text{ pence}$$
$$= 19\text{s. } 8\text{d.}$$

EXAMPLE (iii)—

Referring to Example (ii), calculate the total interest by the end of the year had the money been deposited in a bank paying interest at $2\frac{1}{2}\%$ per cent. per annum, reckoning days and fractions of £1.

$$\text{Interest } = £\frac{45 \cdot 367}{40} + £\frac{5}{2 \times 36500}\left[\begin{array}{c} 5 \times 320 + 1 \cdot 742 \times 239 \\ + 2 \cdot 4125 \times 190 + 4 \cdot 5 \times 51 \end{array}\right]$$
$$- £\frac{5}{2 \times 36500}\left[10 \times 286 + 5 \times 146 + 8 \times 90\right]$$
$$= £1 \cdot 13418 + £\frac{5}{73000}\left[2704 \cdot 2 - 4310\right]$$
$$= £1 \cdot 13418 - £\frac{5 \times 1 \cdot 6058}{73}$$
$$= £1 \cdot 13418 - £ \cdot 10999$$
$$= £1 \cdot 02419$$
$$= £1 \text{ 0s. } 6\text{d.}$$

EXAMPLE (iv)—

A man borrowed £85 14s. for 4 days at 4 per cent. per annum, but at the end of the time the loan was extended for a further 5 days at $4\frac{1}{2}$ per cent. per annum. What was the total interest charged for the loan of the money for the 9 days ? (Use interest table.)

$$\text{Total interest } = (10\tfrac{1}{2}\text{d.} + 1\text{s. } 2\tfrac{7}{8}\text{d.}) \times \cdot 857$$
$$= 25\tfrac{3}{8} \times \cdot 857 \text{ pence}$$
$$= 1\text{s. } 10\text{d.}$$

EXAMPLE (v)—

£720 was deposited on 10th September, 1910, in a bank paying interest at 3 per cent. per annum, interest payable yearly on 31st December. To what did it amount on 16th May, 1917 ? (Use the compound interest table.)

Interest, 10th Sept. to 31st Dec., 1910 $= £\dfrac{720 \times 3 \times 112}{36500}$

$\therefore$ Amount on 31st Dec., 1910 $= £726 \cdot 6279$

$\therefore$ Amount on 31st Dec., 1916 $= £726 \cdot 6279 \times 1 \cdot 194051$

$= £867 \cdot 6308$

Interest, 31st Dec., 1916, to 16th May, 1917 $= £\dfrac{867 \cdot 6308 \times 3 \times 136}{36500}$

$= £9 \cdot 6984$

$\therefore$ Amount on 16th May, 1917 $= £877 \cdot 3292$

$= £877 \text{ 6s. } 7\text{d.}$

EXERCISE (vi)—

What sum would amount to £1,000 in 15 years' time at 5 per cent. per annum, interest payable yearly ?

£2·078928 is the amount of £1

∴£1,000 ,, ,, £$\dfrac{1000}{2·078928}$

= £481 0s. 4d.

EXAMPLE (vii)—

A man leaves £1,200 to be divided between his two sons. The elder is to receive a certain sum in 3 years' time and the younger an equal sum in 7 years' time. Reckoning interest at 5 per cent. per annum, calculate the sum each should receive.

Let £x ≡ sum that each should receive.

Then $\dfrac{x}{1·157625} + \dfrac{x}{1·407100} = 1,200$

∴ $2·564725\ x = 1200 \times 1·157625 \times 1·407100$

∴ $x = \dfrac{1200 \times 1·157625 \times 1·4071}{2·564725}$

$= 762·138$

Ansr.—£762 2s. 9d.

34. DISCOUNTING AND RETIRING OF BILLS.

Banks are usually willing to **discount** bills of exchange for their customers. If the sum named in the bill be in British currency, the amount the banker will give for the bill is the nominal sum, less discount, reckoned on the nominal sum at so much per cent. per annum. Thus, if the nominal sum be £P, the rate per cent. of discount r per cent. per annum, and the number of days from the date the bill is discounted to that of maturity (including the three days of grace) n, then the discount would be £$\dfrac{Prn}{36500}$.

Bank bills and trade bills accepted by firms of high repute can be discounted readily, but those accepted by persons or firms whose financial position is unsound will only be discounted **with recourse** by a banker, by which means should the acceptor fail to pay the bill at maturity the banker can claim the money from the customer for whom he discounted the bill.

Should the bill be in the currency of a foreign country, the banker would quote his customer a rate of exchange somewhat higher (assuming £1 be expressed in the foreign unit) than the rate for bills payable on demand. The difference calculated from

the two rates represents the discount, but it is not, in general, spoken of as such.

It sometimes happens that after a bill has been discounted by a bank, the acceptor is in a position to make payment before the date of maturity. Under these circumstances the bank would allow him to **retire the bill under discount** at a rate slightly less than that at which the bill was discounted. The difference between the nominal sum and the sum paid is known as the **Rebate**.

EXAMPLE (viii)—

A bill for £628 15s. was drawn on 10th May and made payable 3 m/d It was discounted on 18th May at 6¾ per cent. per annum. What was the discounted value of the bill ?

The due date of the bill is 13th August.

∴ Number of days from date of discounting to due date is 87.

$$\therefore \text{ Discount } = £\frac{2515 \times 27 \times 87}{4 \times 4 \times 36500}$$

$$= £10 \text{ 2s. 4d.}$$

∴ Discounted value of bill $= £618$ 12s. 8d.

EXAMPLE (ix)—

A bill for £800 payable 3 months after sight was first seen and accepted on 22nd April. It was retired under discount at 5½ per cent. by the acceptor on 4th May. What sum did the latter pay ?

Number of days from 4th May to 25th July is 82.

$$\therefore \text{ Rebate } = £\frac{800 \times 11 \times 82}{2 \times 36500}$$

$$= £9 \text{ 17s. 8d.}$$

∴ Sum paid by acceptor $= £790$ 2s. 4d.

EXAMPLE (x)—

A man on 5th June wished to retire a bill for 5,000 francs to a London branch of a French bank. The bill was due on 10th July and the man was asked to pay £80 18s. 2d. The current rate of exchange for cheques was £1 = 61·45 francs. What was the rate per cent. per annum of rebate ?

Nominal value of bill at 61·45 exchange $= £\dfrac{5000}{61·45}$

$$= £81·367$$

$$\therefore \text{ Rebate } = £·459$$

Let $r \equiv$ rate per cent. per annum of rebate.

$$\text{Then } \frac{81·367 \times 35 r}{36500} = ·459$$

$$\therefore r = \frac{45·9 \times 365}{81·367 \times 35}$$

$$= 5\tfrac{7}{8} \text{ (just over).}$$

35. RATES OF EXCHANGE.

Foreign merchants wishing to pay for goods purchased from England can do so by buying and forwarding bills drawn on London or other important towns of the United Kingdom. The acceptance of an English banker or first-class business house has become to be an absolute guarantee that the bill will be paid at maturity, and so the price of English bills depends mostly on the supply at the foreign town in question. For example : should there be at New York a supply of bills drawn on London, in excess of the demand, the number of dollars per £1 paid for such bills will tend to fall ; on the other hand, should there be at Paris fewer bills drawn on London than are required by Parisian business men for remitting money to London, the number of francs per £1 paid for such bills will tend to rise. Of course, in times when specie could be exported, the prices of English bills were kept within the specie points, but since the war the prices of these bills have gone far beyond these limits.

The term " Short Exchange " denotes cheques and bills payable at sight, while " Long Exchange " is applied to bills which have a term to run before maturity. Each day the approximate rates at which bills on London can be bought and sold at some of the most important towns of the world are tabulated in the newspapers under the heading " **Foreign Exchanges.**" An example, including telegraphic transfers (T.T.), is shown on the next page.

Persons in England wishing to remit money abroad by means of bills of exchange drawn on the town where the money is to be sent, can usually buy these through bill brokers, who buy and sell foreign bills of exchange and cheques. The rates at which the sales are effected are sometimes given under the heading " **Course of Exchange.**"

Indirect Exchange is the name given to an exchange between two countries through the medium of one or more other countries. For example, a person wishing to remit to Madrid might find it to his advantage to buy a bill drawn on Paris and forward it to an agent in the latter town to have it discounted or collected, and with the proceeds to buy a bill drawn on Madrid. The equivalent rate of exchange is called the **arbitrated rate of exchange.** Such transactions as the above are usually confined to banks and financial houses.

	Method of Quoting.	Par of Exchange.	Latest Quotation.
Paris, cheques . .	Francs to £1 . .	25·22½	63·15–63·25
Berlin . . .	Marks to £1 . .	20·43	241–243
Brussels, cheques .	Francs to £1 . .	25·22½	59·40–59·55
Amsterdam, cheques	Florins to £1 . .	12·107	10·66–10·68
Italy, sight . .	Lire to £1 . .	25·22½	84–86
Greece . . .	Drachmae to £1 .	25·22½	35·50–35·80
Madrid, sight . .	Pesetas to £1 . .	25·22½	22·90–22·95
Lisbon, sight . .	Pence to escudo .	53¼d.	15¼d.–16d.
Switzerland, sight .	Francs to £1 . .	25·22½	22·03–22·07
Christiania, sight .	Kroner to £1 . .	18·159	19·58–19·62
Stockholm, sight .	Kroner to £1 . .	18·159	17·80–17·83
Copenhagen, sight .	Kroner to £1 . .	18·159	22·50–22·60
Helsingfors . .	Marks to £1 . .	25·22½	69–73
Alexandria, sight .	Piastres to £1 . .	97½	97¼–97¾
Bombay, T.T. .	Ster. to rupee .	1s. 4d.	2s. 3¾d.–2s. 4d.
Calcutta, T.T. .	Ster. to rupee .	1s. 4d.	2s. 3¾d.–2s. 4d.
Hong-Kong, T.T. .	Ster. to dollar .	—	4s. 6d.–4s. 9d.
Shanghai, T.T. .	Ster. to tael . .	—	6s. 5d.–6s. 9d.
Singapore, T.T. .	Ster. to dollar .	—	2s. 3¼d.–2s. 4d.
Yokohama, T.T. .	Ster. to yen . .	24·58d.	2s. 5¼d.–2s. 5½d.
New York, cable .	Dollars to £1 . .	4·86⅔	3·95–3·95½
Montreal, cable .	Dollars to £1 . .	4·86⅔	4·29–4·31
Rio de Jan., 90 days	Pence to milreis .	16d.	16¼d.
Buenos Aires, T.T. .	Pence to dollars .	47·58d.	58⅜d.–59⅝d.
Valparaiso, 90 days	Pence to dollars .	—	12₁⁷₃₂d.
Montevideo, T.T. .	Pence to dollars .	51d.	59¾d.–60¼d.
Lima	English to Peru £1	par	18½%

In the case of bills on London bought and sold at towns in the British Colonies where British currency is employed, the price is sometimes quoted at so much premium or discount.

EXAMPLE (xi)—

A bill broker bought a bill for 6,000 kroner at 19·62 exchange, and sold it at 19·58. What was (1) his actual gain in sterling ; (2) his percentage gain ?

$$\text{Amount gained} = £6,000 \times \left(\frac{1}{19\cdot58} - \frac{1}{19\cdot62} \right)$$

$$= £\frac{6000 \times ·04}{19\cdot58 \times 19\cdot62}$$

$$= \text{12s. 6d.}$$

$$\text{Percentage gain} = \frac{\frac{1}{19\cdot58} - \frac{1}{19\cdot62}}{\frac{1}{19\cdot62}} \times 100$$

$$= \frac{4}{19\cdot58}$$

$$= ·204.$$

EXAMPLE (xii)—

When the rate of exchange is £1 = \$3.95½, what is the value in s. d. of £1 in New York ?

$$\text{Par value of } £1 \quad = \$4.86\tfrac{2}{3}$$

$$\therefore \text{Value of } £1 \text{ in New York } = £\frac{395\frac{1}{2}}{486\frac{2}{3}}$$

$$= \text{16s. 3d.}$$

EXAMPLE (xiii)—

What should be paid for a bill on London for £752 6s. 5d. : (1) in Lisbon at 15¾d. per escudo ; (2) in Amsterdam at 10·66¼ florins per £ ?

$$\text{(1) Cost of bill on London } = \frac{180557}{15\frac{3}{4}} \text{ escudos}$$

$$= \text{11463·94 escudos}$$

$$\text{(2) Cost of bill on London } = 752·321 \times 10·6625 \text{ florins}$$

$$= \text{8021·62 florins.}$$

EXAMPLE (xiv)—

What should be paid in London for : (1) a bill on Geneva for fcs. 17000·00 at 22.03½ francs per £ ; (2) a T.T. for 623 tael on Shanghai at 6s. 6½d. per tael ?

$$\text{(1) Cost of bill on Geneva } = £\frac{17000}{22·035}$$

$$= £771 \text{ 10s.}$$

$$\text{(2) Cost of T.T. on Shanghai } = 623 \times 78\tfrac{1}{2} \text{ pence}$$

$$= £203 \text{ 15s. 6d.}$$

EXAMPLE (xv)—

A man wishes his banker to discount a bill drawn on Paris and due two months hence. The rate of exchange for bills payable on demand being 63·20, what rate (to nearest ¼ centime) should the banker quote for discounting the bill so as to be equivalent to deducting discount at 7 per cent. per annum ?

$$\text{Let nominal value of bill } = 100 \text{ francs}$$

$$\text{Then discount } = \tfrac{7}{6} \quad \text{,,}$$

$$\therefore \text{Discounted value of bill } = 98\tfrac{5}{6} \text{ francs}$$

$$= £\frac{98\frac{5}{6}}{63·2}$$

$$\therefore \text{Rate of exchange for discounting bill is } 100 \times \frac{63·2}{98\frac{5}{6}} \text{ francs per } £.$$

i.e. Fcs. 63·94¼ per £.

NOTE 3.—If $x \equiv$ current rate of exchange for bill payable on demand in foreign units per £.

If $r \equiv$ rate per cent. per annum of discount.

If $n \equiv$ number of days from date of discounting to that of maturity.

Then rate of exchange for discounting bill can be easily proved to be $\dfrac{36500 \ x}{36500 - rn}$ foreign units per £1.

EXAMPLE (xvi)—

A bill is bought on Paris at 63·12. The money is collected in Paris and with the proceeds a bill on Greece is bought at 0·58¼ drachmae per franc. What is the arbitrated rate between London and Greece ?

$$£1 \quad = \quad 63·12 \text{ francs}$$
$$= \quad 63·12 \times ·585 \text{ drachmae}$$
$$= \quad 36·92\frac{1}{2} \text{ drachmae.}$$

TEST EXERCISES VI

In the following exercises the interest tables can be used when applicable.

(1) Find the interest on—
    (a) £35 17s. 10d. for 7 days at 5½ per cent. per annum.
    (b) Fcs. 5340.00 for 6 days at 6 per cent. per annum.
    (c) $954.50 for 21 days at 6¼ per cent. per annum.

(2) A firm borrowed £1,500 for a fortnight from a bank on 26th April at 5½ per cent. per annum. On 10th May the loan was extended for another week at 6 per cent. per annum. What sum was due to be paid to the bank on 17th May ?

(3) A man borrowed £300 on 10th August at 6 per cent. per annum, £460 on 6th October at 6¼ per cent. per annum, and £285 on 20th November at 6½ per cent. per annum. The total sum, together with interest, was repaid on 10th December the same year. What was the amount required ?

(4) A person opened a deposit account with a bank by depositing £100 on 11th March. He deposited £50 on 4th May, withdrew £80 on 1st August, and deposited £60 on 5th October. The rate of interest was at 4 per cent. per annum, payable on 30th June and 31st December. What was his account on 1st January of the following year ?

(5) Referring to the previous question, what would have been the account on 1st January had the money been deposited in the Post Office Savings Account ?

(6) A certain bank pays interest at 3 per cent. per annum on money deposited. From the following data, make up the account for the half-year ending 30th June. Account 1st January, £27 11s. 8d. ; deposits made : £10 on 4th February, £8 on 7th April, £5 on 10th June ; withdrawals : £15 on 16th March, £10 on 2nd May.

(7) A man had £45 7s. 8d. deposited in the Post Office Savings Bank on 1st January. He deposited £5 10s. on the first week day of each month excepting January, August, and September. He withdrew £40 in August. What was his account on 1st January of the following year ?

(8) Referring to the previous question, had the man deposited the sums of £5 10s. on the last week-day of each month excepting July, August, and December, what would have been his account on 1st January of the following year ?

(9) A man deposited, on 5th Oct., 1919, £500 in a bank paying interest at 3¼ per cent. per annum, interest payable yearly on 31st December. If the money be left untouched, to what would it amount by 1st May, 1929 ?

(10) Referring to the previous question, what would be the amount, if interest be paid half-yearly, on 30th June and 31st December, given that 1 unit of money will in 9 years amount to 1·366530 unit ?

(11) A bank pays interest at 4½ per cent. per annum, payable yearly on 31st December. What sum deposited in the bank on 31st December, 1920, would amount to £500 on 31st December, 1924 ? Also, what sum deposited on 6th October, 1920, would amount to £500 on 10th April, 1925 ?

(12) £1,000 is invested at 4 per cent. per annum on behalf of two minors, who are to receive equal sums, the first in two years' time and the second in five years' time. What should each receive?

(13) What are the dates of maturity of the following bills drawn on London—

    (*a*) Drawn Saturday, 8th May, 2 m/d.

    (*b*) Drawn Wednesday, 21st April, 30 d/d. (24th May is a Bank Holiday.)

    (*c*) Seen and accepted Wednesday, 30th June, 1 m/s. (2nd August, a Bank Holiday.)

    (*d*) Seen and accepted Tuesday, 8th June, 60 d/s.

(14) On what principal would the interest for 21 days at 4½ per cent. per annum be the same as the interest on £500 for 30 days at 5 per cent. per annum?

(15) What rate of interest is equivalent to discount at 7 per cent. per annum on a bill payable in four months' time?

(16) What is the discount on the following bills?

Amount.	Drawn.	Payable.	Discounted.	Rate.
£320	2nd April	60 d/d.	9th April	6½% per annum
£415	15th May	3 m/d.	26th May	7% ,, ,,
£795 11s. 4d.	8th July	1 m/d.	12th July	6¼% ,, ,,
£504 1s. 6d.	10th July	90 d/d	19th July	7⅛% ,, ,,

(17) What is the discounted value of the following bills?

Amount.	Seen and Accepted.	Payable.	Discounted.	Rate.
£400	5th March	30 d/s.	17th March	6% per annum
£563 17s. 2d.	14th June	3 m/s.	22nd June	7% ,, ,,

(18) A bill for £1,450 was dated 7th August and made payable 3 m/d. The acceptor retired the bill under discount at 5 per cent. per annum on 15th October. How much did the latter pay?

(19) A bill for £1,000, dated 10th March and payable 60 d/d. was discounted by a bank on 23rd March at 7 per cent. per annum. The acceptor of the bill retired the bill under discount at 6 per cent. per annum on 8th April. What was the excess received by the bank over the amount paid? What was the rate per cent. per annum earned by the money paid by the bank in discounting the bill during the period 23rd March to 8th April?

(20) What amounts in sterling should be paid for the following bills?—

    (1) Fcs. 1945.40 ; rate of exchange, 64.84.

    (2) 5,000 pesetas ; rate of exchange, 22.87.

    (3) 236.95 kroner ; rate of exchange, 17.93.

    (4) Rs. 2,700 ; rate of exchange, 2s. 3¼d.

    (5) 2,975 yen ; rate of exchange, 2s. 5⅝d.

(21) Find the equivalents of £715 16s. 6d. expressed in (1) florins at 10.66½ ; (2) dollars (Canadian) at 4.26¼ ; and (3) dollars (Hong-Kong) at 4s. 9d.

(22) What should be paid for a bill on Sydney for £766 12s. 6d. at a premium of ¼ per cent. ?

(23) When francs are at 64·85 and dollars at 3.90¼, what is the rate of exchange between francs and dollars expressed in (1) francs per dollar (to nearest centime) ; (2) dollars per franc (to nearest ½ cent.) ?

(24) A man has a bill on Paris for Fcs. 5700.00 payable on 12th June. If the rate of exchange for bills payable on demand be 65.20, what should the man receive for the bill if he were to have it discounted on 29th April, reckoning discount at 6½ per cent. per annum ?

(25) Given that the rate of exchange between Copenhagen and London is 22.68, draw up a table giving in three columns the values in kroner of 1 up to 9 pence ; 1 up to 9 shillings and £1 up to £9.   Using the table, write down the values in kroner of £73 9s. 7d. and £428 14s. 9d.

(26) A bill for £1,014 17s. 9d. on London was sold in Stockholm at 17.95. What was paid for the bill ?

(27) A man bought a bill on Genoa for 10,000.00 lire, at 96.45.   The lire improved and later on he sold the bill at 88.25.   What did he gain ?

(28) A bill broker bought a bill on Montreal for $770.00 at 4.26.   At what exchange should he sell it so as to gain 1 per cent. on his outlay ?

(29) If the rate of exchange in London on Madrid be 22.85 for three months' bills and 22.62 for bills payable on demand, what would be the equivalent rate of discount per cent. per annum ?

(30) What would a broker gain by buying a bill for 20,000 yen on Yokohama at 2s. 5⅛d. and selling at 2s. 5⅝d. ?

(31) 1 escudo being equivalent to 15¾d. and £1 to 3.90 dollars, what number of cents is equivalent to 1 escudo ?

(32) Brokers are willing to buy bills on Geneva, payable on demand, at 21.94.   Reckoning discount at 7 per cent. per annum, at what rate would they buy bills payable in 30 days' time ?

(33) A British merchant sold to a merchant in Bordeaux 3,264 metres of serge at fcs. 51.20 per metre.   The former drew a bill on the latter for the full amount and the bill was accepted and returned by the latter.   The British merchant's banker discounted the bill at 64.82.   What sum in sterling was received by the merchant in payment for his goods ?

(34) The rate of exchange between London and Amsterdam is 10.65 ; between Amsterdam and Copenhagen, 2.15 kr. per florin. What is the arbitrated rate of exchange between London and Copenhagen *via* Amsterdam ? If the rate between London and Copenhagen direct be 22.65, what sum in sterling would be saved by a banker by remitting 45,000 kronor to Copenhagen *via* bills on Amsterdam ?

(35) The rate of exchange between London and Calcutta is 2s. 3¾d. ; between Calcutta and Yokohama, 1 rupee 1¼ anna per yen ; and between Yokohama and New York, $0.47 per yen. What is the arbitrated rate of exchange between London and New York *via* Calcutta and Yokohama ?

CHAPTER VII

36. A STOCK EXCHANGE

is " the market for stocks and shares." There are stock exchanges at many of the principal commercial towns of England ; but what is usually referred to as " The Stock Exchange " is the **London Stock Exchange**, situated in Throgmorton Street. At the capitals and other large cities of foreign countries there are stock exchanges : that at Paris is known as " The Bourse."

The **London Stock Exchange** building belongs to **shareholders,** who are nearly all members, for, since 1904, every new member has had to become a proprietor by taking up a certain number of shares. The **Trustees,** nine in number, are appointed to look after the interest of the proprietors, who draw their income from entrance fees, annual subscriptions of members and clerks, and rent of offices. The **Committee of Management,** consisting of thirty members, re-elected annually, fixes the days of settlement, prepares the Official Price List, and possesses the power to examine the books of members and expel them if found guilty of unprofessional conduct. The **Members,** a few thousand in number, comprise **Stock-brokers** and **Stock-jobbers.** Each member can employ one **authorized clerk,** two **unauthorized clerks,** and two **Settling-room clerks.** An applicant for membership must have served at least two years as authorized, unauthorized, or settling-room clerk ; and, if a foreigner, he must have been in the United Kingdom for at least seven years and have been naturalized at least two years.

A **Stock-broker** is a member who acts as agent for others in connection with the purchase or sale of shares. His business is to sell to jobbers securities belonging to his clients, and to purchase from jobbers securities on behalf of his clients. To cover payment for his services a broker charges commission or **brokerage.** The rates are $\frac{1}{16}$ per cent. for Consols and Annuities, and $\frac{1}{4}$ per cent. for all other Government stocks. Railway stocks are charged at the rate of $\frac{1}{4}$ per cent. on the purchase money, while for the purchase or sale of shares so much per share is charged. Brokers are sometimes paid commissions by companies issuing new shares for " placing shares," that is, inducing certain of their clients to take up the shares.

A **Stock-jobber** is a member who is always ready to buy shares from or

sell shares to the public, the brokers acting as the go-between. Each jobber confines himself to transacting business in a group of securities known as a "market." No member can be a jobber and broker at the same time. The difference between the price at which the jobber will buy and that at which he will sell is known as **the turn of the market** or the **jobber's turn.** As prices vary from day to day, this difference does not necessarily represent the jobber's profit, but it acts as an approximate measure of the same.

Stamp Duties, at the rate of 5s. per £100 Colonial Stock and at a graduated scale up to 10s. per £50 purchase money in the case of other stocks and shares, are charged on transference of stocks and shares.

37. STOCK EXCHANGE TRANSACTIONS

are very numerous. A simple transaction is illustrated as follows—

(1) A instructs his broker, X, to sell £2,000 Australian 5½ per cent. stock.

(2) X goes to a jobber, J, at the Exchange, and without saying whether he wishes to buy or sell, asks him to quote a price. J quotes, say, 93½–4½, which means he is willing to buy at £93 10s. per £100 stock or to sell at £94 10s. per £100 stock. X claims the right to sell to J at 93½ and each records the bargain.

(3) Meanwhile, B has instructed his broker, Y, to buy £2,000 Australian 5½ per cent. stock.

(4) Y, on asking J for a quotation, and the prices as above being stated, claims to buy the stock at 94½ and each records the bargain.

(5) On **Ticket Day** (i.e. the second day of **Settlement**) Y gives J a ticket bearing his own, B's and J's names, and stating the amount and description of the stock bought. J passes the ticket to X, and thus A and B are indirectly brought together.

(6) X prepares the transfer deed, signed and sealed by A, and this, together with A's stock certificate, is sent to Y, who obtains B's seal and signature to the deed.

(7) On **Settling Day** (i.e. the third and last day of Settlement), Y, who has by now received the purchase money (plus brokerage and transfer duty) from B, pays J, and J pays X. The latter forwards to A a cheque for the amount at which he sold the stock, less brokerage.

(8) Y sends the transfer deed and the stock certificate to the Australian Government Office, where B is registered as holding the stock. The certificate is sent to Y, who then forwards it to B.

EXAMPLE (i)—

Calculate the amounts A should receive and B pay, reckoning brokerage at ¼ per cent. and transfer duty at ¼ per cent. Also calculate the commissions of X and Y respectively and the profit made by J.

Amount received by A $= £20 \times (93\frac{1}{2} - \frac{1}{4})$

$= £20 \times 93\frac{1}{4} = £1,865$

Amount paid by B $= £20 \times (94\frac{1}{2} + \frac{1}{4} + \frac{1}{4}) = £1,900$

Commission received by X $= £5$

Commission received by Y $= £5$

Amount gained by J $= £20$

NOTE 1.—The purchaser pays transfer duty and, in addition, a small fee for registration.

38. CONTANGO AND BACKWARDATION.

The settlement of bargains does not take place immediately,[1] but at the end of periods, which are usually fortnightly; but monthly in the case of English and Indian Government securities. The **Settlement** lasts three days, which are respectively called **Contango** or **Making-up** day, **Ticket** day, and **Settling** day.

On Contango day those persons who wish to postpone settlement can ask for the transaction to be carried over until the next settlement. Suppose, referring to the transaction described, B is not able to pay at the proper time; then Y must find some one from whom he can borrow the money with which to pay J. The lender would receive the stock as security, and, of course, would be paid interest at a fair rate. Y would make a slightly higher charge to B, and this charge is known as **Contango.** Suppose A has not delivered the stock by Contango day; then X must find a person or persons having £2,000 Australian 5½ per cent. stock who are willing to lend it until the next settlement, and money equivalent to the market price would be paid as security. On return of the stock the lender or lenders would refund the money, but a commission would be charged. This commission paid to the lenders of shares and stocks is known as **Backwardation.** This amount, plus a little extra for the additional services rendered by X, would be deducted from the net amount which otherwise A would have received.

39. OFFICIAL QUOTATIONS.

Those securities having good marketability are quoted in an **Official List of Prices** which is issued twice daily. In order to be included in the official quotation, shares must satisfy the following conditions: (1) a considerable number of shares must be issued; (2) the issue must have been publicly advertised; and (3) two-thirds of the shares must have been offered to the public. Selections from the official lists are published daily in the newspapers.

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[1] This refers to normal times. During the European War, and for some time afterwards, dealings were for cash only.

The following is a typical list of nominal quotations—

BRITISH FUNDS.

Consols 2½%	46¼	⅛
War Loan 3½% 1925–28	80½	¾
„ 4½% 1925–45	79	½
„ 5% 1929–47	86½	¾
„ 4% 1929–42	94	½
Funding Loan 4% 1960–90	69½	¾
Victory Bonds 4%	76¼	½
Local Loans 3%	49¼	50½
Irish Land 2¾%	45¼	6¼
London County Council 3½%	57¼	8¼
Metropolitan Cons. 3%	59¼	60¼
Metropolitan Water Board "B"	49¼	50¼
Bank of England	169	72
Port of London 5½% 1921	96	98
India 3%	47¼	8¼
India 3½%	57¾	¾
Transvaal 3% 1923–53	59¼	60¼

COLONIAL GOVERNMENT STOCKS.

Australian 5½% 1920–22 Reg.	95	6
„ 5½% 1922–27	93½	4½
Canada 4% Reg. 1940–60	69½	70½
„ 4½% 1920–25	89½	90½
Cape 3½% Inscribed 1929–49	70½	1½
Natal 3½% Inscribed 1934–44	64	5
New S. Wales 5% 1921–3 Ins.	94	5
„ 5½% 1920–22.	95	6
„ 5½% 1922–27.	93½	4½
„ 5½% 1925–35.	95	6
New Zealand 4% Ins. 1929	79½	80½
Nigeria 5% 1920	99½	100½
Queensland 4½% 1920–25	89	90
South Australia 5% 1921–23	93½	4½
„ 5½% 1922–27	93	4
Union of S. Africa 4% 1943–63	69	70
„ 4½% 1920–25	91½	2½
Victoria 4½% 1920–25	89½	90½
West Australia 4% Ins. 1942–62	68	9

BANKS.

Bank of Australasia (£40)	127	9
Bank Brit. W. Africa (£10, £4 paid)	6½	
Bank of New South Wales (£20)	31½	2½
Bank of New Zealand (6⅜ fully paid)	20½	
Bank of Victoria £10, £5 paid)	4½	5
Barclay "A" (£4)	6⅜	
„ "B" (£1 fully paid)	2¼	
Br. Bk. of S. Amer. (£20, £10 paid)	30¼	
British Trade Corporation (£10)	9¼	
Chartered of India (£20)	73	5x
Lloyds (£5. £1 paid)	2 3/16	5/16
Lon. Jt. City & Mid. (£12, £2¼ paid)	6¼	
Lon. County & West. (£20, £5 paid)	14½	
Nat. of India (£25, £12½ paid)	54	6x
N. of New Zealand (£7½, £2½ paid).	6¾	
Nat. of S. Africa, Bearer (£10)	13	
„ „ Registered (£10)	13	
National Prov. (£25, £3½ paid)	7¾	
„ (£20, £4 paid)	8¾	9½
Union of Australia (£15, £5 paid)	13½	

HOME RAILS.

Caledonian Ord..	42	3
„ Prefd.	33½	4
„ Def.	8½	¾
Central London Def.	46	9
Great Cental Pref.	13	
„ Def.	6¼	

Great Eastern	31½	⅝
Great Northern Def.	30½	⅝
„ Pref.	48½	¾
Great Western	82½	3½
Lancashire and Yorkshire	58	9
London Brighton & S. Coast Def.	48½	9½
London Chatham & Dover Ord..	8⅝	
London and North-Western	85½	6½
London and South-Western Def.	22	
Metropolitan	19½	20½
Metropolitan District	17½	
Midland Def.	52½	3½
„ Pref.	34½	
North-Eastern	88½	9
South-Eastern Def.	29½	30½
Underground Electric "A" (1/–)	5/9	6/3
„ Ord. £10)	1⅛	2 1/16
„ Inc. Bonds	65¼	6½

SHIPPING.

Anglo-European Pref. (£1)	16/–	17/–
„ Ord. (£1)	5/9	6/9
Court Line	38/6	39/6
Cunard	1 9/16	11/16
Ellerman Line 4½% Pref. (£10)	7½	8½
„ 5½% Pref (£10)	9½	
„ Pref. Ord. (£10)	9½	10
Furness Withy	2 1/16	1/8
Houlder Line Pref. (£5)	3½	
Indo-China Def. (£5)	46	8
Khedival Mail	5¼	
Leyland 5% Pref. (£10)	7	
Lon.-American Maritime Trading	34/6	35/6
P. and O. Def.	495	505
Prince Line.	3½	
Royal Mail Ord.	163	7

INDUSTRIALS.

Aircraft Manfg. 7% "B" Pf. (£1)	9/16	11/16
Alby Carbide	11/9	12/9
Alliance Veg. Ord. (1/–)	1⅛	2⅛
Appollinaris Ord. (£10)	1⅛	2⅛
„ 5% Pref. (£10)	3¼	
Argentine Tobacco 6% Pref.	1½	
Associated Cement (£1)	29/6	30/6
„ 5½% Pref. (£1)	14/3	15/3x
„ 4½% Debs	66	9
„ 5% 2nd Debs	76	8
Baker (Albert)	24/6	25/6
Bell's United Asbestos	2 1/16	5/16
Borax Cons. Def.	36/–	37/
Bovril Ord.	20/–	21/–
„ Def.	16/6	17/–
British Automatic	24/6	25/6
Brit. Amer. Tobacco 5% Pref.	15/6	16/6
„ Ord.	5¼	
Brit. Aluminium Ord.	1	¼x
British and Argentine Meat	24/9	25/3
British Cement 6% Pref. (£1)	15/9	16/9
„ Ord.	31/–	32/–
British Cyanides	1 15/16	2 1/16
Brit. Electric Transformer Ord.	1¼	
British Glass Industries	3¼	4
British Oil and Cake Mills	52/–	53/–
British Window Glass 8% Pref..	1 15/16	2 1/16
Bryant and May Ord.	1 11/16	1½
„ 14% Pref.	2⅛	1/16
Brunner Mond	1⅞	2
Callender's Cable (£5)	8¼	
Castner-Kellner Alkali	3 13/16	4 1/16
Dalgety (£20, £5 paid)	10	11

INDUSTRIALS—(contd.)			Hudson's Consolidated . .	⁷/₁	¹¹/₁

Dunlop Rubber . . .	9¼	⅞	7½% Part. Pref.		
6% Pref. .	18/-	19/-	Imperial Tobacco Ord. . .	52/-	53/-
Eastern Smelting Ord. . .	1¼	⅞	„ "B" 6% Pf.	17/9	18/9
„ Pref. . .	1¼	⅞	„ "C" 10% Pf.	26/6	27/6
Eastmans	16/9	17/3	Imperial Tobacco of Canada (Z5) .	20/6	21/6
Edison and Swan . .	21/3	22/3	International Tea 6% Pref. (5) .	3¼	4¼
Forster's Glass, 7½% Pref. .	19/6	20/6	„ 7% "A" Pref. .		1
General Electric . . .	1¼	⅞	International Paint . . .	1¼	¼
Gramophone . . .	1¹⁴⁄₁₆	2¹⁄₁₆	Irish Packing (£1) . .	17/6	18/6
Greenwich Linoleum (10/-) .	13/6	14/6	Lever Bros. 6½% "B" Pref. .	19/3	19/9
Henley's Telegraph Works (£1)	2¹⁄₁₆	⁵⁄₁₆ x	„ 15% Prefd. .	1¹⁄₁₆	¹¹⁄₁₆
Home and Colonial Stores Ord. .	1¹⁵⁄₁₆	2¹⁄₁₆	Liptons . . .	29/-	29/6
„ „ 15% Pref.	11¾	2¹⁄₁₆	„ 5% Pref. . .	13/6	14/-

The two prices represent the buying and selling prices respectively of the jobbers at the end of the half-day in question. Unless otherwise marked, the prices are for £100 stock and for shares of £1 denomination.

40. INVESTMENT AND SPECULATION.

Persons buy stocks and shares either as an investment or for speculation.

A person wishing to make a good investment by buying stock or shares of a company, should make sure the company is on a sound financial basis, should examine what dividends have been paid in the past and what are likely to be paid in the future, and should take note of the market price of the stock or shares. In order to compare the relative merits of two or more investments, the income on equal amounts of cash should be estimated.

The **Yield** is the actual percentage return on cash invested ; and, in practice, it is considered as the sum of money annually produced by the investment of £100 cash.

Persons buying stocks and shares for speculation do so with the hope that after holding them a short time they will, owing to a rise in the market price, make a profit by selling them.

A **Bear** is a person who sells stocks or shares which he has not yet bought, with the idea of forcing prices down, and then, just before settlement, buying the stocks or shares at cheaper prices than those at which he has contracted to sell.

A **Bull** is one who contracts to buy stock with the idea of forcing prices up, so that, just before settlement, he can sell the stock he has bought at higher prices than those at which he has undertaken to pay. The combined efforts of "Bears" and "Bulls" have the effect of steadying prices.

EXAMPLE (i)—

With South Australia 5½ per cent. 1922-27 Stock at 94½, calculate the yield (1) neglecting brokerage and transfer duty ; (2) reckoning brokerage at ⅛ per cent. and transfer duty at ¼ per cent.

(1) £94½ cash brings in an income of £5½

$\therefore$ £100 ,, ,, ,, ,, £$\dfrac{11 \times 2 \times 100}{2 \times 189}$

i.e. Yield = £5 16s. 5d. to nearest 1d.

(2) £95 cash brings in an income of £5½

$\therefore$ £100 ,, ,, ,, ,, £$\dfrac{11 \times 100}{2 \times 95}$

i.e. Yield = £5 15s. 9d.

NOTE 1.—Yield = Dividend $\times$ $\dfrac{\text{Nominal Value}}{\text{Market Price}}$.

EXAMPLE (ii)—

Find (1) by calculation, (2) graphically, which is the best investment of the following : War Loan, 5 per cent., 1929–47, at 86⅞ ; New South Wales, 5¾ per cent., 1925–35, at 96 ; and Ellerman Line, 5½ per cent., Preference £10 shares at 9¾ ?

(1) $\therefore$ An income of £5 is obtained by investing £86⅞ in War Loan, 5%

$\therefore$,, ,, £1 ,, ,, ,, £17·275 ,, ,, ,, ,,

Similarly, ,, ,, £1 ,, ,, ,, £16·696 in N.S.W., 5¾%

,, ,, ,, £1 ,, ., ,, £17·727 in Ellerman Line, 5½%

$\therefore$ New South Wales, 5¾%, is the best investment.

(1) New South Wales. 5¾%
(2) War Loan. 5%
(3) Ellerman Line. 5½%
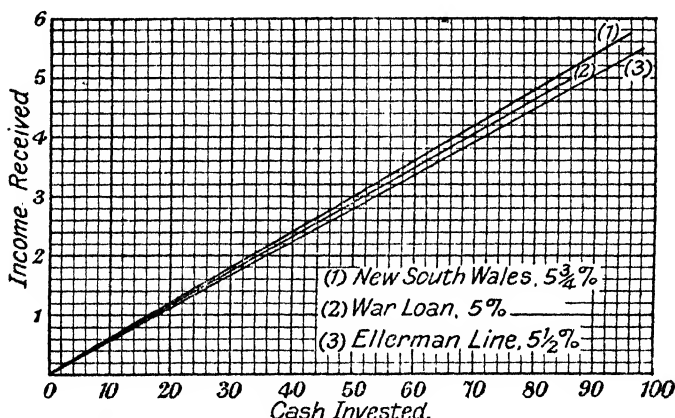
NOTE 2.—When two investments only are to be compared, the quickest method is to find the income on the product of the two respective prices of £100 stock or shares. For example, £86⅞ × 96 cash invested in War Loan 5% produces £5 × 96 (i.e. £480) and invested in New South Wales 5¾% produces £5¾ × 86⅞ (i.e. £496⅜½), therefore the latter is the better investment.

EXAMPLE (iii)—

At the prices quoted in Article 39, (1) calculate the total cost to purchase £560 L.C.C., 3¼ per cent. stock, reckoning brokerage at ¼ per cent. and transfer duty at 10s. per £50 purchase money or fraction of £50 purchase money ; (2) calculate the net proceeds by the sale of 725 shares, Lever Bros. 15 per cent. Prefd., reckoning brokerage at 6d. per share.

Purchase money, plus brokerage	$= £5\cdot6 \times 58\frac{3}{4}$
	$= £329$
Transfer duty	$= £3$ 10s.
Total cost	$= £332$ 10s.
Net proceeds of sale of 725 shares, Lever Bros., 15%	$= £725 \times (1\frac{11}{16} - \frac{1}{40})$
	$= £725 \times \frac{133}{80}$
	$= £1,205$ 6s. 3d.

EXAMPLE (iv)—

At the prices given, and neglecting brokerage and transfer duty, calculate, approximately, the dividend that should be paid on Bryant & May's Ord. shares so that it should be as good an investment as the 14 per cent. Pref. shares.

$$\text{Income obtained by investing } £100 \text{ cash } = £\frac{100}{2\frac{3}{16}} \times \frac{14}{100}$$

$$= £\frac{32}{5}$$

Let $r \equiv$ percentage dividend on ordinary shares.

$$\text{Then } \frac{100}{1\frac{13}{16}} \times \frac{r}{100} = \frac{32}{5}$$

$$\therefore r = \frac{32 \times 29}{5 \times 16} = 11\frac{3}{5}.$$

NOTE 3.—This answer could be obtained more readily from the fact that, the yield being the same, the dividend is proportional to the market price per share. Thus $\frac{r}{14} = \frac{1\frac{13}{16}}{2\frac{3}{16}}$, therefore $r = \frac{14 \times 29}{35} = 11\frac{3}{5}$.

The result is only approximate, because it has been assumed that £100 cash could be fully invested, whereas, as fractions of shares are never sold, this could not be the case.

EXAMPLE (v)—

What is the least number of Home and Colonial 15 per cent. Pref. shares that must be bought at the prices given in Article 39, in order that an income of at least £200 per annum will be obtained ? Calculate the total amount required to buy these shares, reckoning brokerage at 6d. per share and transfer duty at 10s. per £50 or part of £50 purchase money.

£15 per annum is obtained by purchasing 100 shares

$$\therefore £200 \qquad \text{,,} \qquad \text{,,} \qquad \text{,,} \qquad \frac{100 \times 200}{15} \text{ shares}$$

i.e. $1,333\frac{1}{3}$ shares

$$\therefore \textbf{1,334 shares} \text{ must be purchased.}$$

Amount required to purchase 1,334 shares $= £1,334 \times (2\frac{1}{16} + \frac{1}{40}) + £28$

$$= £2,812 \text{ 4s. 6d.}$$

EXAMPLE (vi)—

A man paid £2,136 11s. 3d. (including brokerage at ¼ per cent.) for the purchase of certain 6 per cent. stock, and the income obtained was £132 10s. At what price was the stock bought ?

Let $£x$ ≡ price of £100 stock including brokerage,

then $\dfrac{x}{6} = \dfrac{2136 \frac{9}{16}}{132\frac{1}{2}}$

∴ $x = \dfrac{6 \times 34185 \times 2}{16 \times 265} = 96\frac{3}{4}$

∴ Price of stock = **96½**

EXAMPLE (vii)—

A man sold £7,200 Transvaal 3 per cent. stock at 59½, and with the proceeds purchased Home and Colonial 15 per cent. Pref. shares at $2\frac{1}{16}$. Reckoning brokerage at ¼ per cent. and 3d. per share respectively, calculate the increase in his income.

Income from Transvaal 3% stock = £216

Amount received by selling stock = £72 × 59½

= £4,266

Cost of 100 15% Pref. shares = £(206¼ + 1¼)

= £207½

∴ Number of shares bought = $\dfrac{4266}{207\frac{1}{2}} \times 100$

= 2,055 (neglecting fraction)

∴ Income from 15% Pref. shares = £20·55 × 15

= £308 5s.

∴ Increase in income = **£92 5s.**

EXAMPLE (viii)—

A man sold £5,000 War Loan, 5 per cent. at 86 (brokerage ¼ per cent.), and invested the proceeds partly in New South Wales 5¾ per cent. at 96¾ and partly in Associated Cement 5 per cent. Debs. at 78¾ (brokerage ¼ per cent. in each case). His income was thereby increased by £9 13s. 8d. How much of each stock did he buy ?

Income from War Loan = £250

∴ ,, ,, N.S.W. 5% stock, and 5% Debs. = £259 13s. 8d.

Net proceeds from sale of War Loan = £50 × 85¾ = £4,287½

Let $£x$ ≡ cash, plus brokerage invested in N.S.W. stock.

then $£(4,287½ - x)$ ≡ ,, ,, ,, ,, 5% Debs.

then $£\dfrac{100\,x}{97}$ ≡ Amount of N.S.W. stock bought

and $£\dfrac{100(4287½ - x)}{79}$ ≡ Amount of 5% Debs. bought.

$$\therefore \frac{5\frac{1}{4}\,x}{97} + \frac{5(4287\frac{1}{2} - x)}{79} = 259\frac{41}{60}$$

$$\therefore \frac{23\,x}{388} + \frac{42875 - 10\,x}{158} = \frac{15581}{60}$$

$$\therefore\; 23 \times 158\,x + 42875 \times 388 - 3880\,x = \frac{15581 \times 388 \times 158}{60}$$

$$\therefore\; 3634\,x - 3880\,x = 388 \times \left\{ \frac{15581 \times 79}{30} - 42875 \right\}$$

$$\therefore \qquad 246\,x = \frac{388 \times 55351}{30}$$

$$\therefore \qquad x = \frac{388 \times 55351}{30 \times 246}$$

$$\therefore\; \text{Amount of N.S.W. stock bought} = \pounds\frac{388 \times 55351 \times 100}{30 \times 246 \times 97}$$

$$= \pounds 3,000 \text{ (to nearest } \pounds 1\text{)}$$

$$\text{Income from 5\% Debs.} = \pounds(259\tfrac{41}{60} - 172\tfrac{1}{2})$$

$$= \pounds 87\tfrac{11}{60}$$

$$\therefore\; \text{Amount of 5\% Debs. bought} = \pounds\frac{87\frac{11}{60}}{5} \times 100$$

$$= \pounds 1,743\tfrac{2}{3}$$

EXAMPLE (ix)—

A man invested $\frac{1}{3}$ of his capital in 5 per cent. stock at 72, $\frac{1}{4}$ of his capital in 6 per cent. stock at 96, and the remainder in 6$\frac{1}{2}$ per cent. stock at 97$\frac{1}{2}$. What was the average yield on the entire investments ? His total income was £517 10s. ; what was his capital ?

Let 100 units represent his capital.

$$\text{Then yield} = \frac{100}{3} \times \frac{5}{72} + \frac{100}{4} \times \frac{6}{96} + \frac{500}{12} \times \frac{6\frac{1}{2}}{97\frac{1}{2}}$$

$$= 100 \times \left[\frac{5}{216} + \frac{1}{64} + \frac{1}{36} \right]$$

$$= 100 \times \frac{40 + 27 + 48}{216 \times 8} = \frac{11500}{216 \times 8}$$

$$\therefore\; \text{Average yield per } \pounds 100 \text{ capital} = \pounds 6 \text{ 13s. 1d.}$$

$$\text{Amount of capital invested} = \pounds\frac{1035}{2} \times \frac{216 \times 8}{115}$$

$$= \pounds 7,776$$

EXAMPLE (x)—

A man bought £5,000 stock when the price was 63–64. He did not pay at the time of settlement : what total sum would he have to pay at the time of the following settlement, the charges being : brokerage $\frac{1}{8}$ per cent. contango for 14 days on market buying price at 7 per cent. per annum ? If, before

the time of the next settlement he had sold out at $65\frac{1}{2}$–$66\frac{1}{2}$, what would he have gained ? (Neglect transfer duty.)

$$\text{Cost of stock plus brokerage} = £50 \times 64\frac{1}{2}$$

$$= £3,225$$

$$\text{Contango} = £\frac{50 \times 64 \times 14 \times 7}{36500}$$

$$= £8 \text{ 11s. 10d.}$$

$$\therefore \text{ Total sum to be paid} = £3,233 \text{ 11s. 10d.}$$

$$\text{Proceeds of sale, less brokerage} = £50 \times 65$$

$$= £3,250$$

$$\therefore \text{ Net gain} = £16 \text{ 8s. 2d.}$$

TEST EXERCISES VII

When prices of stocks and shares are not given in the following exercises, those given in Article 39 are to be taken.

(1) Reckoning brokerage at $\frac{1}{4}$ per cent. and transfer duty at 5s. per £100 or fraction of £100 stock, calculate the amounts necessary to purchase the following—

    (a) £840 Australian, $5\frac{1}{4}$ per cent.   (b) £1,765 Canadian, 4 per cent.
    (c) £2,172 10s. New Zealand, 4 per cent. (d) £4,720 Victoria, $4\frac{1}{2}$ per cent.

(2) Calculate the net amounts received by the sale of the stock of the previous question.

(3) Reckoning brokerage at 6d. per share and transfer duty 10s. per £50 or fraction of £50 purchase money, calculate the sums of money required to purchase the following—

    (a)   720 shares, Cunard Shipping Company.
    (b) 1,640 Argentine Tobacco 6 per cent. Pref. shares.
    (c) 2,864 Bovril Ordinary shares.
    (d) 2,975 Lever Bros. 15 per cent. Prefd. shares.

(4) Calculate the respective net amounts received by the vendors of the shares of the previous question.

(5) Neglecting transfer duty, calculate the amounts of stock that could be bought in each of the following cases—

    (a) £3,000 invested in Metropolitan Water Board " B " (brokerage, $\frac{1}{2}$ per cent.)
    (b) £1,820 invested in Consols (brokerage, $\frac{3}{16}$ per cent.)
    (c) £683 6s. 8d. invested in Queensland $4\frac{1}{2}$ per cent. (brokerage, $\frac{1}{4}$ per cent.)

(6) What incomes would be obtained by the investments (b) and (c) of the previous question ?

(7) Calculate the yield in the case of the investments (b) and (c) of Question (5).

(8) Calculate the number of shares which could be obtained with the following sums of money—

    (a) £2,840 invested in Lloyds (£5, £1 paid), brokerage 1s. 6d. per share.
    (b) £2,100 invested in Leyland 5 per cent. Pref. (£10), brokerage 2s. per share.
    (c) £10,000 invested in Edison & Swan, brokerage 6d. per share.

(9) The price of a certain company's £10 shares (£7 paid) is 8¼–8¾, and the dividend paid is at the rate of 7¼ per cent. per annum. Reckoning brokerage at 2s. per share, and neglecting transfer duty, calculate the income that would be obtained by investing, as nearly as possible, £2,000 in the company.

(10) Calculate the yield of the investment of the previous question.

(11) A's broker stated that £865 of a certain stock was sold by him for £514 13s. 6d. Calculate the price at which he sold the stock, and, reckoning brokerage at ½ per cent., find the net amount received by A.

(12) What profit was made by a jobber who bought £3,833 6s. 8d. stock at 73¼ and sold £2,500 of it at 73⅝ and the remainder at 73¾ ?

(13) 1,600 £5 shares of a certain company were sold by A's broker at 4⅝ and bought by B's broker at 4¹⁵⁄₁₆. Brokerage at 1s. 6d. per share was charged by each broker, and transfer duty was at 10s. per £50 or part of £50 purchase money. What was B's total outlay, and what was the net amount received by A ?

(14) What must be the price of 5½ per cent. stock in order that by investing £3,713 an income of £258 10s. will be obtained ?

(15) How much 4½ per cent. stock must be bought in order to give an income of £330 ? What must be paid for the stock, the price being 63¼, brokerage ½ per cent., and transfer duty 10s. per £50 or part of £50 purchase money ?

(16) What income will be derived by investing £925 in 6 per cent. stock at 98 ?

(17) What must be the price of 5 per cent. stock in order that after Income Tax at 6s. in the £ is deducted the yield is £5 10s. 11d. to the nearest penny ?

(18) A man received from his broker the sum of £1,802 10s. from the sale of £1,750 stock. At what price did the broker sell it ? (Brokerage ½ per cent.)

(19) How much should a man invest in 3½ per cent. stock at 57¾ in order that, after Income Tax at 6s. in the £ has been deducted, he should have a net income of £400 ?

(20) A man bought 1,000 £1 shares at 23s. and, after receiving a half-year's dividend at 12 per cent., sold the shares at 25s. 3d. What was his total gain ?

(21) Referring to the previous question, calculate the gain, allowing for brokerage at 6d. per share and transfer duty at 10s. per £50 purchase money.

(22) Find, (1) graphically, (2) by calculation, which is the best investment of the following—

    (i) Consols, 2½ per cent. at 46¾.
    (ii) New South Wales, 5¾ per cent. at 96.
    (iii) Ellerman Line, 4½ per cent. Pref. (£10) at 8¼.

(23) Certain £20 shares (£7 10s. paid) can be bought at 9⅔. At what rate must dividend be paid in order that the yield should be £9 12s. ?

(24) A man sold £3,500 London and North-Western stock at 86¼ (brokerage ½ per cent. on purchase money) and with the proceeds bought as many as possible of Eastern Smelting ordinary £1 shares at 1⅞ each (brokerage 4d. per share). A half-year's dividend of 12½ per cent. was paid on the latter. How much did the man receive, Income Tax at 6s. in the £1 having been deducted ?

(25) Arrange the following investments in order of profitableness : (1) 4½ per cent. £1 shares at 15s. 9d. ; (2) 7 per cent. £10 shares at 9⅞ ; (3) 10 per cent. £10 shares (£6 10s. paid) at 7¼ ; (4) 6 per cent. stock at 97¼.

(26) How much must be invested in Port of London 5¼ per cent. stock at 98 in order that, after Income Tax at 6s. in the £ has been deducted, an income of £300 can be obtained ?

(27) A company invested £5,000 of the reserve in purchasing stock at 95.

Later on, the price fell to 73½. What was the depreciation in the reserve due to the fall in price ?

(28) A person sold £3,600 5 per cent. War Loan at 86⅜ (brokerage ⅛ per cent.), and with the proceeds purchased Associated Cement 5 per cent. Debentures at 78 (brokerage ⅛ per cent.). What was the increase of his income ?

(29) A man purchased 1,250 5s. shares at a premium of 9d., and later on sold them at a discount of 7d. What was the total extent of his loss ? (Brokerage 3d. per share.)

(30) How many £5 shares (£3 15s. paid) must be bought in order that when a half-year's dividend of 16 per cent. per annum be paid, the amount received, after Income Tax at 6s. in the £ has been deducted, should be £210 ?

(31) What dividend must be paid on London, County and Westminster Bank £20 shares (£5 paid) at 14¾ in order that the yield should be the same as Bryant & May's 14 per cent. Preference shares at 2¾₁₆ ?

(32) A man invested ¼ of his money in 3½ per cent. stock at 56, ⅓ in 5 per cent. stock at 86, and the remainder in 7 per cent. stock at par. What was the average yield on his investments ?

(33) Referring to the previous question, the total income being £463 11s. 6d., calculate the total sum invested.

(34) A man invested £3,600, partly in 4¾ per cent. stock at 66½ and partly in 3½ stock at 55. The total income obtained was £240. How much money did he invest in each stock ?

(35) £3,000 6 per cent. stock at 98 is sold and with the proceeds 5 per cent. stock is bought. An increase in income of £7 10s. is thus obtained. At what price was the 5 per cent. stock bought ? (Brokerage ½ per cent.)

(36) Dividends paid during the year on 5s. shares of an oil company amounted to 9d. per share. What rate per cent. is this ? If the shares could be bought for 13s. 3d. each, what would be the yield ?

(37) What sum of money would procure £30 more per annum if invested in 4 per cent. stock at 64½ than if invested in 5 per cent. stock at 86¼ ?

(38) A " bull " speculated as follows in 5s. shares of a rubber company. He purchased 2,000 shares at a discount of 6d. ; 1,500 shares at a premium of 2d. ; 2,500 shares at a premium of 4d. ; 4,000 shares at a premium of 7½d. He sold 5,000 at a premium of 1s. ; 3,500 at a premium of 10d., and the remainder at a premium of 9d. Reckoning brokerage at 3d. per share, calculate his gain.

(39) A " bear " sold £1 shares of a certain company as follows : 8,000 at 17s. 4d. ; 5,000 at 16s. 10d. ; 10,000 at 16s. 2d. Before the time of settlement he purchased 12,000 at 15s. 10d. and the remainder at 16s. 3d. Reckoning brokerage at 6d. per share, calculate his loss.

(40) A man bought £4,000 Colonial 4½ per cent. stock at 72. He did not pay at the time of settlement. What sum would he have to pay at the time of the next settlement, the charges being as follows : brokerage ¼ per cent., transfer duty 5s. per £100 stock, contango on purchase money for 14 days at 7 per cent. per annum ?

CHAPTER VIII

41. CARRIAGE BY RAIL.

THE *Railway and Canal Traffic Act*, 1888, was supplemented by the *Railway Rates and Charges Order Confirmation Acts*, 1891 *and* 1892. By these Acts, commodities have been classified, and the maximum rates and charges for each class have been fixed.

Commodities are classified broadly into six classes—

    I. Goods and Minerals ;
    II. Animals ;
    III. Carriages ;
    IV. Exceptional Class ;
    V. Perishable Merchandise by Passenger Train ; and
    VI. Small Parcels by Merchandise Train.

Goods and Minerals are again classified : heavy goods being in either of Classes A, B, or C ; and light goods in Classes 1, 2, 3, 4, or 5.

Important goods under each of the classes are as follows—

A. Coal, coke, gravel, iron ore, limestone, sand, stone straight from a quarry.

B. Bricks, concrete and concrete blocks, granite, pig-iron, slates, building stone, heavy iron and steel appliances, such as anvils, bars, shells not filled, etc.

C. Grain, flour, vegetables, timber, soda, articles of iron and steel (e.g. axles, wheels, beams, corrugated iron, rails), telegraph stores.

1. Builders' implements, ales and beers in cases or casks, raw cotton, hemp, jute, dyewoods, iron plates, oils in casks.

2. Agricultural machines and implements in cases, seeds, bacon, fish, ice, dried fruit, leather, copper, machinery in parts, earthenware.

3. Glass, heavy drapery, butter and cheese, eggs in crates, groceries, milk, hardware, boots and shoes in boxes, books, articles of wood, spirits in casks or cases.

4. Light drapery, boots and shoes in hampers, electrical instruments, drugs, dyes, fine skins, wine in hampers, tobacco (not cigarettes or cigars), saddlery, fresh meat, confectionery, toys.

5. Cigars and cigarettes, clocks, furniture, pictures, musical instruments, articles of silk, velvet and plush, furs, game, live poultry, millinery.

Certain of the maximum rates and charges, as determined by

the Acts in respect of goods in Class I, are given in the following tables. These rates and charges have now been increased, and the extent of the increases are tabulated—

In respect of Merchandise comprised in the under-mentioned Classes.	MAXIMUM TERMINALS.				
	Station Terminal at each end. PER TON.	Service Terminals.			
		Loading. PER TON.	Unloading. PER TON.	Covering. PER TON.	Uncovering PER TON.
	s. d.	s. d.	s. d.	d.	d.
A . . .	— 3	—	—	—	—
B . . .	— 6	—	—	—	—
C . . .	1 —	— 3	— 3	1	1
1 . . .	1 6	— 5	— 5	1·50	1·50
2 . . .	1 6	— 8	— 8	2	2
3 . . .	1 6	1 —	1 —	2	2
4 . . .	1 6	1 4	1 4	3	3
5 . . .	1 6	1 8	1 8	4	4

The following tables show the maximum rates for conveyance in the case of commodities classified under Class I—

GREAT NORTHERN AND LONDON AND NORTH-WESTERN RAILWAYS.

In respect of Merchandise comprised in the under mentioned Classes.	For Consignments except as otherwise provided in the Schedule.			
	For the first 20 Miles, or any part of such Distance.	For the next 30 Miles, or any part of such Distance.	For the next 50 Miles, or any part of such Distance.	For the remainder of the Distance.
	PER TON PER MILE. d.	PER TON PER MILE. d.	PER TON PER MILE. d.	PER TON PER MILE. d.
A . .	0·95	0·85	0·50	0·40
B . .	1·25	1·00	0·80	0·50
C . .	1·80	1·50	1·20	0·70
1 . .	2·20	1·85	1·40	1·00
2 . .	2·65	2·30	1·80	1·50
3 . .	3·10	2·65	2·00	1·80
4 . .	3·60	3·15	2·50	2·20
5 . .	4·30	3·70	3·25	2·50

The maximum rates for conveyance on the lines of the *Great Eastern*, the *Midland*, and the *Great Western Railways* are, in the case of goods classified C 1, 2, 3, 4, 5, identically the same as those on the Great Northern Railway. The four columns as regards classes A and B for each of these railways are shown on page 106.

		d.	d.	d.	d.
G.E.R.	A	1·15	0·90	0·45	0·40
	B	1·40	1·05	0·80	0·55
M.R.	A	1·15	0·90	0·45	0·40
	B	1·25	1·00	0·80	0·50
G.W.R.	A	1·50	0·90	0·40	0·35
	B	1·60	1·20	0·80	0·50

The rates regarding merchandise specified in Class A do not include provision of trucks by the railway companies ; when not included in the maximum rates for conveyance, the companies may charge for the use of trucks any sums not exceeding the following—

	s.	d.	
For distances not exceeding 20 miles	–	4½	per ton
,, ,, exceeding 20 miles, but not exc. 50 miles	–	6	,,
,, ,, 50 ,, ,, ,, ,, 75 ,,	–	9	,,
,, ,, 75 ,, ,, ,, ,, 150 ,,	1	–	,,
,, exceeding 150 ,,	1	3	,,

Where goods specified in Classes A and B are consigned in quantities of less than 4 tons and not less than 2 tons, the Company may charge at the rates applicable to Classes B and C respectively, and if less than 2 tons, the rates applicable to Classes C and 1 respectively, provided that the Company shall not charge more than as for a consignment of 4 tons in the first case and of 2 tons in the second case.   Also when merchandise under Class C is consigned in quantities less than 2 tons, the Company may charge for such consignment the rates applicable to Class 1 provided that the Company shall not charge more than as for a consignment of 2 tons.

When a consignment by merchandise train is over 3 cwt. and under 5 tons in weight, a fraction of ¼ cwt. may be charged for as a ¼ cwt., and when over 5 tons in weight, a fraction of a ¼ ton may be charged for as a ¼ ton.   For a fraction of a mile the Company may charge according to the number of ¼ miles in that fraction, and a fraction of a ¼ mile may be charged for as a ¼ mile.   For a fraction of 1d. in the gross amount of rates and charges for a consignment for the entire distance carried, the Company may demand 1d.

When stone in blocks cannot be conveniently weighed, 14 c. ft. of stone can be charged for a ton.   The measurement weight for timber is 40 c. ft. to the ton for heavy timber such as oak, mahogany, teak, and beech, 50 c. ft. to the ton for light timber such as poplar, larch and fir, but not deals, battens, and boards, 66 c. ft. of which may be charged for as 1 ton.

INCREASE OF RATES AND CHARGES. [1]

Class.	Increase.
A	Coal, coke, and patent fuel : 25 per cent. plus 3d. per ton
	Other goods and minerals : 30 per cent. plus 3d. per ton.
	In both cases the minimum addition is 6d. per ton and the maximum 2s. per ton
B	40 per cent. plus 3d. per ton ; minimum 6d. per ton ; maximum 3s per ton
C	50 per cent. plus 6d. per ton
1 to 5	60 per cent. plus 1s. per ton

[1] Further increases have taken place since the above were made, but these are not permanent, for new scales of rates and charges are to be formulated by a Tribunal set up to deal with matters concerning transport by rail.

The flat rate addition, which is irrespective of distance. includes the increase of the terminal charges. The above rates do not include cartage in case of collection and delivery. The increase of cartage is 1s. 6d. per ton for collection and 1s. 6d. per ton for delivery. There are reduced rates for goods at owner's risk ranging from 17½ to 50 per cent. less than the totals determined from the foregoing tables. There are also charges, termed **Demurrage,** for the use of the railway companies' trucks beyond an agreed time.

Certain exceptions to the above increases are—

Manure, basic slag, or lime for agricultural purposes : no increase.
Vegetable and roots in Class C, hay and straw in lots of 2 tons and upwards : 25 per cent. plus 6d. per ton.
Hay and straw in Classes 1 to 3, and fruit in 2-ton loads : **25 per cent.** plus 1s. per ton.

Space will not allow of the rates and charges for conveyance of goods in Classes II to VI being given, but certain important increases are as follows : Live stock, " head " rates, 60 per cent., " truck " rates, 60 per cent. plus 1s. per truck ; carriages, 60 per cent. ; small parcels, 100 per cent. ; returned empties, full truck loads, 50 per cent., other cases, 100 per cent. The exceptions are : fruit, vegetables, eggs, butter, cream, soft cheese, and poultry by passenger train, 25 per cent. only ; milk, no increase.

EXAMPLE (i)—

Calculate the maximum cost, including terminals but not cartage, to transport by rail 13 tons 12 cwt. 1 qr. 18 lb. of grain from Liverpool to London, a distance of 200¾ miles ?

Cost for 1 ton of grain, first	20	miles	= 1·8 × 20 pence	=	36	pence
,,	,,	,,	next 30	,,	= 1·5 × 30 ,,	=	45	,,
,,	,,	,,	,, 50	,,	= 1·2 × 50 ,,	=	60	,,
,,	,,	,,	,, 100¾ ,,		= ·7 × 100¾ ,,	=	70·525	,,
Station terminals per ton at both ends					=	24	,,
Service	,,	,,	,,	,,		=	8	,,

∴Total cost for 1 ton = 243·525 ,,
50 per cent. increase = 121·762 ,,
Flat rate increase per ton = 6 ,,

∴Increased total cost for 1 ton = 371·287 ,,
∴ ,, ,, ,, 13¾ tons = 5105·1 . . ,,
= £21 5s. 6d.

EXAMPLE (ii)—

Calculate the maximum cost, including terminals, to transport 750 tons of limestone 285 miles by the Midland Railway.

Cost for 1 ton of limestone, first	20	miles	= 1·15 × 20 pence	=	23	pence
,,	,,	,,	next 30	,,	= ·9 × 30 ,,	=	27	,,
,,	,,	,,	,, 50	,,	= ·45 × 50 ,,	=	22·5	,,
,,	,,	,, remaining 185	,,	= ·4 × 185 ,,	=	74	,,
Station terminals per ton at both ends				=	6	,,

∴Total cost for 1 ton = 152·5 ,,
Maximum increase per ton = 24 ,,

∴Increased total cost for 1 ton = 176·5 ,,
∴ ,, ,, ,, 750 tons = £551 11s. 3d.

NOTE 1.—A 30 per cent. increase plus 3d. per ton would, in the above case, amount to a total increase of 48·75d. per ton, but the maximum increase, under both heads, for **Class A goods is 2s. per ton.**

EXAMPLE (iii)—

Before increase, the rate for the conveyance by rail of a beast of burden was : 3d. per mile, first 50 miles ; 1·65d. per mile for remainder of distance ; terminals at each end, 10d.   Calculate the maximum cost to convey 5 horses 172½ miles by rail.

Cost for 1 horse, first 50 miles	=	150 pence
„ „ „ remaining 122½ miles = 1·65 × 122½ pence ·=	202·125 „
Terminals, per horse, at both ends	=	20 „
Total cost for 1 horse	=	372·125 „
60 per cent. increase	=	223·275 „
∴ Increased total cost for 1 horse	=	595·4 „
∴ „ „ „ 5 horses	=	2,977 „
	=	£12 8s. 1d.

42. TRANSPORTATION OF GOODS BY SHIPS.

A merchant or agent wishing to have goods sent across the sea can have this done by the payment of the freight to a shipping company ; or if the quantity of goods be large, it might be to his advantage to charter a ship.

Freight is the sum payable to a shipowner or his agent for the conveyance of goods from one port to another.

As regards ships belonging to British owners, freight on outgoing goods is usually payable prior to departure, and that on incoming goods on delivery to the consignee.   Freight is paid in a variety of ways ; for example—

Per ton measurement of 40 cub. ft. or 50 cub. ft., usually for bulky goods which are not very heavy.

Per ton weight, usually for heavy goods.

Per ton measurement, together with so much per ton weight.

Per lb., as in the case of wool or cotton.

Per quarter, as in the case of wheat and maize (1 qr. = 480 lb.) and oats (1 qr. = 256 lb.).

Per bushel, as in the case of wheat from the United States and Canada.

Per Petrograd Standard (165 cub. ft.), as in the case of timber.

Per lump sum for an article of large size.

Ad valorem for small expensive articles, such as jewellery.

Freight is frequently stated to be at so much per ton (or lb., qr., bush., etc.) and 10 per cent. *primage*.   The sum of money called the primage was originally paid to the captain of the ship, but now it simply forms part of the freight paid to the shipowner or agent.

By **chartering** a ship, a merchant or other trader can have the use of the ship either between two specified ports or for a

specified time. The document which sets forth the terms under which the owner of a vessel allows the charterer to hire the same is known as the **Charter Party.**

The number of tons of cargo the ship is capable of carrying is stated in the Charter Party, and the cost of chartering is usually stipulated as being so much per ton. If the ship should have a capacity greater than that required by the charterer for the carrying of his own goods, he can, if the terms of the Charter Party permit, sublet portions of the vessel, and he may use the ship to carry cargo belonging to other merchants. The freight charged by the charterer may be greater or less than that stated in the Charter Party, but the total of the amounts on the Bill of Lading must correspond to the total amount at the Charter Party rate. Thus, if a charterer can sublet portions of the ship at a rate higher than the Charter Party rate, the Bills of Lading in reference to his own goods can be made out at a lower rate. If, however, he is not able to obtain a full cargo for the ship, he must pay **dead freight,** that is, freight on the empty cargo space at the same rate as if this space were fully occupied.

When ships are chartered for a voyage between specified ports, a number of days is allowed the charterer for the loading of the ship. These days are known as the *Lay Days*, and they begin to run 24 hours after the captain of the vessel notifies the charterer in writing that the ship is free of inward cargo. Should the charterer exceed the number of lay days in the loading of the ship, he must, if in accordance with the terms of the Charter Party, pay *demurrage* at so much per register ton per day.

The total capacity of each ship is officially expressed in registered tons (1 registered ton = 100 cub. ft.), and this is known as the gross tonnage. The net tonnage is the capacity after the space taken up by the machine and boiler rooms, bunkers, etc., and the rooms for the accommodation of the crew, have been deducted and so measures the amount of space available for the carrying of cargo.

EXAMPLE (iv)—

Goods are packed in cases each measuring 5 ft. × 4 ft. 6 in. × 3 ft. 4 in., and the average gross weight per case is 10 cwt. 3 qr. 22 lb. Calculate the freight on 30 cases at the following rates—

    (*a*) 31s. 6d. per ton of 40 cub. ft. plus 10 per cent. primage.
    (*b*) £5 12s. 6d. per ton of 20 cwt. plus 10 per cent. primage.
    (*c*) 30s. per ton of 50 cub. ft. together with 24s. 6d. per ton of 20 cwt. plus 10 per cent. primage.

$$(a) \text{ Freight plus primage } = \pounds\frac{5 \times 4\frac{1}{2} \times 3\frac{1}{3}}{40} \times 30 \times 1\frac{23}{40} \times \frac{11}{10}$$

$$= \pounds\frac{5 \times 9 \times 10 \times 30 \times 63 \times 11}{2 \times 3 \times 40 \times 40 \times 10}$$

$$= \pounds97 \text{ 9s. 1d.}$$

(b) Freight plus primage $= £30 \times \dfrac{10\frac{53}{56}}{20} \times 5\frac{5}{8} \times \frac{11}{10}$

$= £\dfrac{30 \times 613 \times 45 \times 11}{20 \times 56 \times 8 \times 10}$

$= £101 \text{ 11s. 11d.}$

(c) Freight plus primage $= £\left[\dfrac{5 \times 9 \times 10 \times 30 \times 3}{2 \times 3 \times 50 \times 2} + \dfrac{30 \times 613 \times 49}{20 \times 56 \times 40} \right] \times \dfrac{11}{10}$

$= £[67\cdot5 \times 20\cdot114] \times 1\cdot1$

$= £96 \text{ 7s. 6d.}$

EXAMPLE (v)—

A ship capable of carrying 1,360 tons (40 cub. ft.) of cargo was chartered at 26s. per ton. On the voyage, the ship carried 970 tons of cargo, the bills of lading being made out at the following rates : 500 tons at 27s. 6d. plus 10 per cent. primage ; 350 tons at 28s. plus 5 per cent. primage ; and 120 tons at 25s. plus 10 per cent. primage. Calculate the amount of the dead freight.

					£	s.	d.
Freight on	1,360	tons at	26s.	=	1,768	–	–
,, ,,	500	,,	27s. 6d. and 10%	=	{ 687	10	–
					68	15	–
,, ,,	350	,,	28s. and 5%	=	{ 490	–	–
					24	10	–
,, ,,	120	,,	25s. and 10%	=	{ 150	–	–
					15	–	–
∴ ,, ,,	970	tons		=	1,435	15	–
	∴ Dead Freight			=	£332	5	–

EXAMPLE (vi)—

Referring to the previous example, if the remaining 390 tons of cargo space had been occupied, at what rate should the bill of lading for this cargo have been made out in order that the average rate for the whole cargo carried should have been at the chartered rate ? (Express the answer as so much per ton plus 10 per cent. primage.)

		£	s.	d.
Freight, plus 10% on 390 tons of cargo	=	332	5	–
Primage	=	30	4	1
∴ Freight on 390 tons without primage	=	£302	–	11
∴ Freight per ton, without primage	=	15s. 6d. to nearest 1d.		

Ansr.—15s. 6d. per ton plus 10% primage.

TEST EXERCISES VIII

At the rates given in the tables, calculate the total maximum cost, including increases, of conveying goods in each of the following twelve cases—

	Class.	Railway.	Quantity.	Distance.
(1)	A	G.N.R.	450 tons	80 miles
(2)	A	G.N.R.	450 tons	300 ,,
(3)	A	G.N.R.	450 tons	4 ,,
(4)	B	G.W.R.	240 tons	172 ,,
(5)	B	G.W.R.	240 tons	25 ,,
(6)	C	G.E.R.	7 tons 16 cwt.	95 ,,
(7)	1	L.N.W.R.	8 tons 12 cwt. 50 lb.	122 ,,
(8)	2	M.R.	2 tons 4 cwt.	66¾ ,,
(9)	3	M.R.	6 tons 22 lb.	132⅝ ,,
(10)	4	L.N.W.R.	3 tons 1 cwt. 4 lb.	73¾ ,,
(11)	5	G.E.R.	2 tons 3 cwt. 1 qr.	116¾ ,,
(12)	C, Vege-tables.	G.E.R.	5 tons 11 cwt. 3 qr.	86¼ ,,

(13) Calculate the total cost, including 10s. 6d. cartage, to send cases of boots and shoes, gross weight 23 cwt. 1 qr. 18 lb., by rail from Nottingham to London, a distance of 123½ miles on the M.R.

(14) What is the total cost, exclusive of demurrage, to rail, M.R., 500 tons of coal from Derby to London, a distance of 128½ miles ?

(15) How much more would it cost to have 7 tons 3 cwt. 2 qr. 16 lb. of a Class B commodity railed 75 miles on the G.W.R. than on the G.N.R. ?

(16) One standard of timber is 165 cub. ft. and timber sawn into planks is scheduled in Class 1. Calculate the maximum cost to convey 650 planks, each 12 ft. × 9 in. × ¾ in., a distance of 85½ miles, on the G.W.R., reckoning a measurement ton as (1) 40 cub. ft., (2) 50 cub. ft.

(17) 40 blocks of stone, each measuring 3 ft. × 2 ft. 6 in. × 2 ft. are conveyed 115½ miles on the G.N.R. Assuming 14 cub. ft. to be taken as 1 ton, and that the stone is classified C, calculate the total cost of conveyance including £2 15s. for cartage.

(18) A van and contents together weigh 2¼ tons. Calculate the maximum cost to send it 68 miles by rail at the following rates : Carriage not weighing more than 1 ton, 6d. per mile first 50 miles, 3·3d. per mile next 18 miles ; for every additional ¼ ton, 2d. per mile first 50 miles, 1·35d. per mile next 18 miles ; terminals, 3s. per ton ; increase, 60 per cent.

(19) A number of boxes of eggs, altogether weighing 5 cwt. 2 qr., are conveyed by passenger train a distance of 85 miles. What is the maximum cost of conveyance at the following rates : first 20 miles, ·6d. per cwt. per mile ; next 30 miles, ·45d. per cwt. per mile ; next 35 miles, ·24d. per cwt. per mile ; terminals, 3d. per cwt. ; increase, 25 per cent. ?

(20) What is the freight on 136 cwt. 1 qr. 17 lb. gross weight of cotton at ⅞d. per lb. and 10 per cent. primage ?

(21) Calculate the freight on 1,255 cwt. of oats at 6s. per qr. of 256 lb.

(22) What is the freight on 23 tons 5 cwt. 1 qr. 14 lb. at 24s. 3d. per ton of 20 cwt. plus 10 per cent. primage ?

(23) 25 cases of goods, each case measuring 6 ft. × 4 ft. 6 in. × 3 ft. 6 in., are shipped at 23s. 6d. per ton of 40 cub. ft. plus 5 per cent. primage. Calculate the freight.

(24) Obtain a multiplier for converting freight in dollars per short ton into shillings per ton, given that £1 = $3.90.

(25) Convert a rate of 17s. 9d. per ton of 40 cub. ft. plus 10 per cent. into francs per cubic metre, the rate of exchange being 59·40.

(26) Goods are packed in 20 cases, each measuring 5 ft. × 4 ft. × 3 ft. 6 in. and the total gross weight is 14 tons 1 cwt. 2 qr. 21 lb.   Calculate by how much it would be cheaper or dearer to send them at 28s. per ton of 40 cub. ft. and 10 per cent., than at £3 15s. per ton of 20 cwt.

(27) 50 cases of goods altogether have a gross weight of 453 cwt. 1 qr. 12 lb., and each case measures 5 ft. × 4 ft. 3 in. × 3 ft. 6 in.   What freight per ton of 20 cwt. is equivalent to 17s. 9d. per ton of 40 cub. ft. and 10 per cent. primage ?   Also what price per ton of 40 cub. ft. plus 10 per cent. primage is equivalent to 19s. per ton of 20 cwt. ?

(28) A merchant who wished to have 1,170 tons of cargo conveyed from one port to another chartered a ship, having 2,240 tons cargo space, at 24s. per ton.   He obtained cargo for the ship as follows :   420 tons at 26s. per ton and 10 per cent., 350 tons at 27s. 6d. and 5 per cent., and 300 tons at 23s. 6d.   At what rate should the bill of lading on his own cargo be made out ?

(29) A shipbroker placed cargo space as follows :   250 tons at 17s. 6d., 172 tons at 17s. 9d. plus 5 per cent., and 114 tons at 18s. plus 10 per cent. Calculate the total of his commission, the latter being at the rate of 5 per cent.

(30) A shipbroker booked up 300 tons of cargo space at 27s. 6d. per ton on a certain ship.   He let 120 tons at 30s. 6d. per ton, 75 tons at 29s. per ton, 273 cwt. 1 qr. 18 lb. at ¾d. per lb., and articles valued at £12,250 at an *ad valorem* rate of 2½ per cent.   What did he gain ?

CHAPTER IX

43. INSURANCE OF GOODS.

PRACTICALLY everyone possessing goods and property insures the same against destruction or damage. The money paid in respect of insurance is termed the **premium,** and is usually quoted as so much per cent. (i.e. per £100 on the value of the goods insured). The document on which the terms of the insurance are stated is termed the **insurance policy.** By carrying on a wide business, an insurance company or underwriter is able to estimate the extent of the risk, and thus obtain a basis for the determination of the premium.

If goods be insured for an amount less than their value, in the event of total loss the amount for which the goods are insured can be claimed. In the event of partial loss or damage, however, the full amount of the loss, even if less than the amount on the policy, could not be claimed. For example, if goods whose value is £200 be insured for £150, then, in the event of damage, it would be considered that three-quarters only of the goods had been insured, and thus if the damage amount to £80, the sum that could be claimed would be three-quarters of £80, that is, £60.

In general, if goods be insured for an amount greater than the actual value, an amount greater than the actual value could not be claimed in the event of total loss. If the goods be partially lost, the fraction that the actual loss is of the actual value is estimated, and this sum only can be claimed. For example, if goods, actual value £100, be insured for £150, in the event of half the goods being lost, £50 only can be claimed. There are two important exceptions : for it is legitimate to insure for such an amount that, in the event of loss, the full value plus the cost of insurance can be claimed ; also, in connection with the importation of goods, insurance can be effected to cover the total of invoice price, freight, insurance premium, commission to agents, and 10 per cent. to cover estimated profits.

EXAMPLE (i)—

Goods whose value is £1,367 8s. 4d. are damaged, the extent of the loss being £573 4s. 10d. How much could be claimed if the goods be insured for (a) £1,500, (b) £1,200 ?

(a) **£573 4s. 10d.** could be claimed.

(b) Fraction of goods insured $= \dfrac{1200}{1367 \cdot 417}$

∴ Amount that could be claimed $= £\dfrac{1200 \times 573 \cdot 242}{1367 \cdot 417}$

$= $ **£503 1s. 2d.**

EXAMPLE (ii)—

The value of certain goods is £1,840, and they are insured at 14s. per cent. For what amount should they be insured so that in the event of total loss, the full value of the goods, together with the insurance premium, could be obtained from the insurance company ?

Value of goods insured for £100 $= $ £99 6s.

∴ Amount for which goods should be insured $= $ £1,840 $\times \dfrac{100}{99 \cdot 3}$

$= $ **£1,852 19s. 5d.**

44. MARINE INSURANCE.

Insurances at **Lloyds** are effected through the medium of brokers, who receive their remuneration from the **underwriters** in the form of a reduction of 10 per cent. on the premiums paid. The broker writes down on a slip the insurance he desires to effect and presents it to the underwriters with whom he usually does business. The underwriters note on the slip the share of the insurance they are willing to take, and since the widest possible distribution of risk is desirable, each of them will, generally, only underwrite a comparatively small sum. In the event of loss the broker, who is responsible to his client for the amount of the claim, will collect from the underwriters the amounts they have taken liability to pay.

In effecting insurances with insurance companies, much larger " lines " are taken. Where several companies are concerned, it is customary to disclose to each the names of the companies where other specified parts of the same insurance are placed, so that each may know its share of the risk.

45. KINDS OF POLICIES AND CLAIMS.

Policies are divided into various classes—

Voyage Policies and **Time Policies,** in which property is insured for transit from one point to another only, or for a certain period of time.

Valued Policies and **Open Policies,** in the former of which the value of the insured object is definitely stated at the time of drawing up the contract. In open policies there is no such statement ; but the value of the goods lost or damaged must be proved if required : as a rule, the basis is formed by the invoice value, in addition to shipping charges and a certain percentage on account of profit.

Named Policies, in which the name of the vessel on which the risk is taken is definitely stated ; and **Floating Policies,** where the wording is wide enough to cover the insured property by whatever ship it may come.

Almost all claims on underwriters are made in consequence of loss due to perils of the sea, which include—

(1) *Particular Average.* (2) *General Average.* (3) *Total Loss.*

Particular Average Claims are those which arise from unavoidable causes, such as storms at sea, fire, or accident of any description. It is usually agreed between the underwriters and the insured that no claim for loss by these causes shall be made unless it amounts to 3 per cent. of the value declared in the policy. When insuring goods of high value or in large quantities, it is sometimes agreed to take each lot of an agreed number of packages separately. Thus, if any one package or part of any series of packages be insured to the extent of 3 per cent. on its declared value, a claim may be made for it ; whereas if the 3 per cent. were taken on the whole consignment, such a claim, of course, could not be made.

On some goods it is necessary that the claim should amount to 5 per cent., whilst on others no claim for particular average loss can be made at all. Among the former class are sugar, tobacco, hemp, flax, hides, and skins ; and among the latter are corn, fish, salt, fruit, flour, and seed. The reasons for these exceptions are that these two classes of goods are exceptionally hazardous by reason of their peculiar liability to spontaneous injury.

The measure of any Particular Average loss is the difference between the amount realized for the goods concerned in their damaged condition and the sum they would have realized had they arrived sound and uninjured.

General Average Claims arise in another form, and may be distinguished from those made under Particular Average as follows—

(1) Such losses are distributed over all the persons having any share or interest in the ship and her cargo.

(2) They always arise out of some act done voluntarily by the master of the ship involved, and for the purpose of rescuing the ship and her cargo from some loss which would have caused her to become a total loss.

For example, suppose a ship is being blown towards the shore and the crew are unable to prevent her from being cast on to it. The master may call in the assistance of a steam tug, which is able to keep the ship from becoming a wreck by towing her to a place of safety. The remuneration for the services of the steam tug is not the time and labour expended as in ordinary towage, but is proportional to the value of the property saved from destruction, and thus may amount to a considerable sum. The arrangement of the amount to be paid, and the payment of it, fall upon the shipowner ; but he is entitled to recover a part of the sum from those others whose interests are concerned. These interests are generally—

(1) The ship.
(2) The sum she is earning for freight on the voyage.
(3) The cargo she is carrying.

Suppose the expense for towing amounted to £1,000 and that the ship is worth £9,000, the freight £1,000, and her cargo £10,000 ; that is, a total of £20,000. Then—

the ship   would have to pay $\frac{9}{20}$ of £1,000, i.e.   £450,
,, freight   ,,   ,,   ,, $\frac{1}{20}$,,   ,,   £50,
,, cargo   ,,   ,,   ,, $\frac{10}{20}$,,   ,,   £500.

In a similar manner, if the master of a ship deem it necessary for the safety of the property under his control to sacrifice any part of it so as to secure the safety of the ship and the remaining cargo, he is entitled to do so ; but the owners of the lost property are entitled to receive payments on the basis of General Average from those whose property has been made secure by the master's action.

Total Loss Claims are generally easier to settle than those already mentioned. They may be divided into two classes—

For example, a ship may founder at sea and never again be heard of. After a time, when she is posted as "missing," the underwriters pay the sum for which they have insured. Or the vessel may sink after collision, when likewise the underwriters must pay. Again, she may run on shore and there be more or less broken to pieces, when the owners of ship and cargo alike may call upon the underwriters to accept an *abandonment*. The latter will do this if the demand is justified, and accept for total loss, taking as their own the proceeds of the sale of so much of the insured property that may have been saved from the wreck.

EXAMPLE (iii)—

A ship, damaged in a gale, was assisted by lighters. Some of the cargo was jettisoned and some was damaged. Particulars of the losses incurred are given as follows—

Contributory Values for General Average.	£	General Average Statement.	£
Ship (less cost of repairs, which is a Particular Average Item)	90,000	Shipowners' Losses — Charges to lighters, harbour dues, warehousing of cargo, wages of crew, claim expenses, etc.	8,400
Freight	6,500	A & Co.'s goods lost	4,697
A & Co.'s goods	15,250	B & Co.'s { goods lost	2,356
B & Co.'s ,,	5,000	{ goods damaged (sound val.)	1,422
C & Co.'s ,,	22,000	C. & Co.'s goods damaged (sound value)	15,825
D & Co.'s ,,	8,250		
Total of contributory values	£147,000	Total of losses	£32,700

Calculate the net amounts to be received or paid out by each.

			£	s.	d.	£
Shipowner pays $£\frac{327}{1470} \times 96,500$, i.e.	21,466	6	6	and receives	8,400

A ,, $£\frac{327}{1470} \times 15,250$, i.e. 3,392 6 11 ,, ,, 4,697

B ,, $£\frac{327}{1470} \times 5,000$ i.e. 1,112 4 11 ,, ,, 3,778

C ,, $£\frac{327}{1470} \times 22,000$ i.e. 4,893 17 7 ,, ,, 15,825

D ,, $£\frac{327}{1470} \times 8,250$ i.e. 1,835 4 1 ,, ,, nil

Total £32,700 0 0 Total £32,700

	£	s.	d.
∴ Net amount paid by shipowner	= 13,066	6	6
,, ,, ,, ,, D	= 1,835	4	1
Total	= £14,901	10	7
,, ,, received ,, A	= 1,304	13	1
,, ,, , ,, B	= 2,665	15	1
,, ,, ,, ,, C	= 10,931	2	5
Total	= £14,901	10	7

NOTE 1.—Assuming that ship, freight, and cargo are fully insured, the respective underwriters must make good the above losses. The amounts due to be paid by the underwriters to their respective clients are calculated by an average adjuster. Thus the amount to be paid out by the shipowner's group of underwriters is £21,466 6s. 6d., of which £8,400 is eventually paid to the shipowner to make good his loss, and the remainder (i.e. £13,066 6s. 6d.) goes to the total that is shared out among those whose loss of cargo is greater than the proportionate loss they are called upon to bear. It is seen that B's and C's damaged goods are regarded as a total loss in making the calculations. In these cases, however, the underwriters are entitled to the proceeds of the sale of the damaged goods,

EXAMPLE (iv)—

Seven bales of tanned goat skins, Nos. 82/89, were imported from India, and insured for £1,800, but claim under particular average could not be made on account of damage in any one bale unless amounting to 3 per cent.   Certain of the skins in bales 82 and 85 were stained by sea-water.   The total proceeds of the sale amounted to £2,002 19s. 8d.   The sale of skins in bales 82 and 85 were effected as follows—

No. 82.   1 Bale containing 444 Skins.

204 skins, sound, weighed net 247 lb., at 14s. 6d. per lb.

216 ,,   ,,   ,,   ,,   191 ,,   ,, 15s. 9d.   ,,

24   ,,   damaged

No. 85.   1 Bale containing 589 Skins.

162 skins, sound, weighed net 137 lb., at 11s. 9d. per lb.

139 ,,   ,,   ,,   ,,   59 ,,   ,, 11s. 0d.   ,,

222 ,,   ,,   ,,   ,,   214 ,,   ,,   9s. 3d.   ,,

66   ,,   damaged

Damaged Skins.

Bale 82, 24 skins, weighed net 25 lb., sound value 15s. 9d. per lb. ⎫ £3 5s.
 ,,   85, 48 ,,   ,,   ,, 21 ,,   ,,   ,,   11s 0d.   ,,   ⎬ per
 ,,   85, 18 ,,   ,,   ,, 16 ,,   ,,   ,,   9s. 3d.   ,,   ⎭ dozen.

The broker who sold the skins charged £1 1s. as fee for certificate of sale, and 16s. 2d. plus 85 per cent. for sorting.   Make out the Statement of Particular Average, the fee for the statement being £2 2s.

		£	s.	d.
Sound value of damaged skins in bale 82	=	19	13	9
,, ,, ,, ,, ,, 85	=	18	19	0
Total	=	£38	12	9
Proceeds of sale of damaged skins	=	£24	7	6

Proportional proceeds, Bale 82 $= £\dfrac{19\frac{55}{80}}{38\frac{51}{80}} \times 24\frac{3}{8}$

$= £12$ 8s. 5d.

Proportional proceeds, Bale 85 $= £11$ 19s. 1d.

STATEMENT OF PARTICULAR AVERAGE
ON Tanned Skins per s.s. "City of Bristol," of Bristol, from Madras to London.

		£	s.	d.
Prime	7 Bales Tanned Skins sold for	2,002	19	3
⟨KSA⟩	Deterioration on 24 skins (bale 82)	7	5	4
Madras Tannery	,, ,, 66 ,, (bale 85)	6	19	11
	Total sound value . . .	£2,017	4	6

Insured Value, £1,800.

No. 82. 1 *Bale containing* 444 *Tanned Skins.*

	£	s.	d.
204 skins, sound, weighed net 247 lb. at 14s. 6d. per lb.	179	1	6
216 ,, ,, ,, ,, 191 ,, 15s. 9d. ,,	150	8	3
24 ,, Damaged, sound value	19	13	9
444 skins	£349	3	6

If Sound.

	£	s.	d.
24 Tanned skins, weighed net 25 lb. at 15s. 9d. per lb.	19	13	9

Did Sell.

	£	s.	d.
90 Tanned skins sold for £24 7s. 6d.			
Proportional proceeds	12	8	5
Deterioration	£7	5	4

Not 3 per cent.

No. 85. 1 *Bale containing* 589 *Tanned Skins.*

	£	s.	d.
162 skins, sound, weighed net 137 lb. at 11s. 9d. per lb.	80	9	9
139 ,, ,, ,, ,, 59 ,, 11s. 0d. ,,	32	9	0
222 ,, ,, ,, ,, 214 ,, 9s. 3d. ,,	98	19	6
66 ,, Damaged, sound value	18	19	0
589 skins	£230	17	3

If Sound.

	£	s.	d.
48 Tanned skins, weighed net, 21 lb. at 11s. 0d. per lb.	11	11	0
18 ,, ,, ,, ,, 16 ,, 9s. 3d. ,,	7	8	0
66 skins	£18	19	0

Did Sell.

	£	s.	d.
90 Tanned skins sold for £24 7s. 6d.			
Proportional proceeds	11	19	1
Deterioration	£6	19	11

	£	s.	d.
Damage covered by insurance	6	4	11
Assorting for stained skins, 16s. 2d.			
Plus 85% 13s. 9d.			
	1	9	11
	7	14	10
Fee for Certificate of Sale	1	1	0
	£8	15	10

Fee for Statement, £2 2s. 0d.
Lloyds', 14*th March*, 19 . .
A. B. & Son,
Aldgate, E.C.

NOTE 2.—The loss owing to the fact that certain of the skins were stained is divided between Bales 82 and 85 in proportion to the sound values of the damaged

skins in the respective bales. The deterioration, in the case of Bale 82, is less than 3 per cent. of the total sound value of the skins therein, and so no claim can be made. The deterioration of the contents in Bale 85 is £6 19s. 11d., but as the skins whose total sound value was £2,017 4s. 6d. were only insured for £1,800, the amount claimed is £6 19s. 11d. reduced in the ratio of £2,017 4s. 6d. to £1,800.

TEST EXERCISES IX

(1) Calculate the premium to be paid to insure goods for £5,860 at 10s. 9d. per cent.

(2) What is the premium per cent. if £11 16s. 3d. be paid in order to insure goods for £3,500 ?

(3) Property, valued at £850, is insured for £700. If damage to the extent of £162 10s. be incurred, what amount would the insurance company be liable to pay ?

(4) The net weight of goods is 27 cwt. 1 qr. 6 lb. and the invoice price is 2s. 1½d. per lb. Freight was 42s. 4d. per ton of 40 cub. ft. on 412 cub. ft., plus 10 per cent. primage. If 10 per cent. be added to the total price, including freight, to cover expenses and estimated profits, for what amount, to the nearest £1, should the importer insure the goods ? Calculate the premium at 10s. 10½d. per cent.

(5) Goods valued at £1,600 are insured at 17s. 6d. per cent. for an amount such that, in the event of loss, the owner would receive the equivalent value of the goods, together with the premium paid. For what sum to the nearest £ are the goods insured ?

(6) Referring to the previous question, find the amount for which the goods should be insured in order to cover profits estimated at 6 per cent. of the value of the goods.

(7) Goods valued at £3,350 were insured for £2,750. Calculate the amounts of the claims if (1) goods, value £900, were destroyed and the remainder undamaged ; (2) goods, sound value £1,150, deteriorated 42 per cent. and the remainder 10 per cent. ; (3) one-third of the goods were destroyed, one-third deteriorated 30 per cent., and the remainder 5 per cent.

(8) A merchant insured goods for 80 per cent. of their real value. Owing to fire, 35 per cent. of the goods were destroyed, 55 per cent. damaged so as to depreciate 40 per cent., and the remainder undamaged. Neglecting the amount of the premium paid, calculate what percentage the merchant's loss was of the sound value of the goods.

(9) Goods are insured for £8,000 at 12s. 9d. per cent. The sum of £8,000 was estimated by increasing the value of the goods by 5 per cent. and adding the cost to insure. Calculate to the nearest £ the value of the goods.

(10) A man paid a premium of 16s. per cent. in having his goods, valued at £4,250, fully insured. Damage, resulting in a depreciation of 21·3 per cent., was incurred. Calculate the net loss sustained by the company by effecting the insurance.

(11) A company estimates that for every £1,000 worth of goods stored in certain warehouses, the depreciation is £7 11s. 6d. What premium per cent. should they charge in order to gain on the average 25 per cent. to cover expenses and profit ?

(12) Property whose actual value was £2,450 was insured at 2s. 9d. per cent. Fire caused damage to repair which £750 was paid. The insurance company paid the owner £612 4s. 11d. in respect of the loss. For what amount was the property insured ?

(13) A person placed the insurance of his belongings, value £3,600, with two companies, A and B. With A, the amount insured was £2,200 and with

B, £1,800. A loss of £1,280 was incurred. What sums respectively were the companies liable to pay ?

(14) Referring to Example (13), what amounts would the companies have been liable to pay had the amounts insured been £2,000 and £1,200 respectively ?

(15) Owing to a collision of a ship, some of the cargo was thrown overboard. The total loss, including ship, freight, cargo, and expenses, amounted to £3,200. The total of contributory values was £17,600. Roberts & Co. had goods on board to the value of £1,620, and these were undamaged. Assuming that the goods were fully insured, calculate the amount the underwriters of these goods could be called upon to pay.

(16) Referring to the previous example, if Roberts & Co.'s goods had been insured for £1,400, calculate the respective amounts Roberts & Co. and their underwriters would have to pay under General Average.

(17) With reference to Example (15), Brown had cargo on board insured for £2,000, but the sound value was £2,360. This cargo was lost. What was the personal loss incurred by Brown ?

(18) A ship ran aground in a fog ; some of the cargo was thrown overboard to lighten the ship, and with the assistance of tugs the ship was towed into port. From the following details, calculate the losses (neglecting the proceeds of the damaged goods) incurred by the respective underwriters, assuming the ship, freight, and cargo were fully insured.

Contributory Values for General Average.		General Average Statement.	
	£		£
Ship (less cost of repairs) . .	74,000	Shipowner's losses (including expenses and charges)	6,200
Freight	4,400	P & Co.'s goods lost . . .	1,400
P & Co.'s goods . . .	11,600	„ „ damaged (sound value)	3,500
Q & Co.'s „ . . .	2,700	Q & Co.'s goods lost . . .	2,700
R & Co.'s „ . . .	12,200	R & Co.'s „ . . .	2,800
S & Co.'s „ . . .	3,400	„ „ damaged (sound value)	1,400
T & Co.'s „ . . .	11,700	T. & Co.'s goods lost . . .	2,000
Total of contributory values	£120,000	Total of losses . . .	£20,000

(19) Of a number of cases containing silk goods, sea-water penetrated through three, each of which contained 2 dozen dressing gowns. Those in the first case were valued at 52s. 6d., in the second 63s. 9d., and in the third 72s. 6d., all these being the sound values. One dressing gown in the first case, five in the second case, and six in the third case were stained. The twelve stained dressing gowns were sold in one lot for £25. By first calculating the proportional proceeds of the sale of the damaged goods, find the deterioration in each case.

(20) Referring to the previous question, if the three cases of goods were insured for £200, calculate the total amount of the claim under Particular Average, no claim to be made on any case of goods where the deterioration is not greater than 3 per cent.

(21) Of 20 cases of a certain commodity of uniform quality, 4 were damaged by sea-water. The gross weight of the 4 cases of the commodity when in sound condition was 22 cwt. 2 qr. 10 lb., tare 3 qr. 22 lb. The gross weight of the 4 cases in the damaged state was 23 cwt. 1 qr. 6 lb. The sound value was 1s. 10d. per lb., and in the damaged condition 1s. 1¼d. per lb. The gross weight of the remaining 16 cases was 92 cwt. 1 qr. 10 lb., tare 3 cwt. 3 qr. 2 lb. The whole of the quantity of the commodity was insured for £1,000. Make out the Statement of Particular Average, adding on £1 1s. for certificate and £1 8s. plus 80 per cent. for sorting.

(22) 12 bales of wool were imported and insured for £300 ; they were damaged, particulars being as follows—

	Gross Weight (Undamaged).			Tare and Draft.		Gross Weight (Damaged).			Price at which Sold.
	cwt.	qr.	lb.	qr.	lb.	cwt.	qr.	lb.	
6 bales	21	3	20	3	24	23	1	6	1s. 2d. per lb.
4 ,,	14	2	18	2	16	15	1	26	1s. 3d. ,,
2 ,,	7	1	10	1	8	7	2	24	1s. 4d. ,,

The price of wool in the sound condition was 1s. 6d. per lb. ; calculate the percentage deterioration correct to 3 places of decimals, in each of the three quantities of damaged goods.

(23) Using the data and the answers to the previous question, calculate the extent of the claims under Particular Average.

CHAPTER X

46. BANKRUPTCY.

THE law of bankruptcy affords relief to insolvent debtors whereby, by surrendering their assets for the benefit of their creditors, they are enabled to obtain relief from liability as regards their debts. Legal proceedings can be commenced either by a creditor who must have at least an unsecured sum of £50 owing to him, or by the debtor himself presenting a petition to the Court. If the petition be fully in order, the Court issues a receiving order, which must be advertised in the *London Gazette* and in a local paper, and notifies the Board of Trade. An **Official Receiver** appointed by the latter takes control of the debtor's business until the creditors appoint a **trustee,** who is frequently the Official Receiver himself. The debtor having been declared a bankrupt, the trustee winds up the business by realizing the assets, and after paying in full the **preferential claims,** such as wages, rent, rates, taxes, and legal expenses, a dividend of so much in the £ is made to the ordinary creditors. A bankrupt is not allowed to be a Member of Parliament or to hold municipal office, and it is a criminal offence if he obtain a sum exceeding £20 on credit without stating at the time that he is a bankrupt.

Repayments to the unsecured creditors cannot be made until the creditors who hold securities have been paid. In the case where the security held by a creditor exceeds the amount owing to him, the latter is repaid in full and the difference added to the amounts realized from other assets. Should the security be less than the amount of the debt, the creditor would receive the full amount realized upon the security and on the remaining part of the debt, the same amount in the £ as received by the unsecured creditors.

In order to avoid the expense, undue loss, and disgrace of bankruptcy proceedings, the creditors and the debtors can agree to a **deed of arrangement,** the most common forms of which are—

(1) **Deed of Assignment,** by which a trustee can realize the assets and distribute the proceeds *pro rata* to the creditors.

(2) **Deed of Composition,** whereby the debtor is released from

his liabilities on condition that he agrees to pay his creditors so much in the £ in a lump sum or by instalments.

(3) **Deed of Inspectorship**, which allows the debtor to carry on his business under the supervision of a trustee appointed by the creditors, with the understanding that repayments are to be made whenever the financial position of the business renders this possible.

EXAMPLE (i)—

After a business was wound up, a dividend of 9s. 2⅝d. in the £ was paid to the unsecured creditors. What was the total amount received by a partially secured creditor to whom £2,150 was owing and whose security realized £1,750 ?

Total amount received by the creditor = £1,750 + (110⅝ × 400) pence

= £1,750 + £183 19s. 2d.

= **£1,933 19s. 2d.**

47. DISSOLUTION OF PARTNERSHIP.

On dissolving partnership, should a loss be incurred, the partners individually must bear this loss either equally or in accordance with a mutual agreement. From the point of view of Book-keeping, these contributions are regarded as being paid into the firm's account, and when this has been done there will be sufficient to repay the capital in full to each partner. This amounts to the same as deducting the losses to be borne by each partner from their respective capitals and paying out the remainder.

In the event of a partner's contribution to a loss being greater than his capital in the firm, then out of his own private means he must pay the difference. If, however, owing to personal insolvency, he is unable to make this payment, an additional loss will have to be borne by the remaining partners. This loss is not regarded as an additional loss to the firm, but as a personal loss to the remaining partners, and, as such, must be borne by them in proportion to their capitals.

In the case when all the partners constituting a firm become bankrupt, the creditors of the firm, except those who hold securities, will receive rateably the realization of the assets after expenses and preferential claims have been paid. If there be a surplus of the separate estate of any one partner (not a limited partner) beyond what will satisfy the separate creditors, it will be applied towards the deficiency remaining to the joint creditors of the firm. In other

words, he must meet the losses of the firm as far as the realization of his separate estate will allow.

Should a person be an ordinary or general partner in two or more firms, all of which become bankrupt, the surplus of his separate estate would be distributed among the firms rateably in proportion to his liabilities.

EXAMPLE (ii)—

On dissolving partnership, the partners X, Y, and Z have £6,000, £4,000, and £2,500 capital respectively in the firm, and by agreement they are to share losses in the ratios 6 : 5 : 4. The net loss is £10,500. What are the net amounts due to X and Y if (1) Z is unable to contribute to the loss other than his capital ; (2) Z can pay £200 to the firm out of his private estate ; (3) Z has overdrawn his capital to the extent of £1,500 and is able to pay neither this nor his contribution to the loss ?

$$X\text{'s contribution to the loss} = \tfrac{6}{15} \times 10{,}500 = £4{,}200$$
$$Y\text{'s} \quad ,, \quad ,, \quad ,, \quad = \tfrac{5}{15} \times 10{,}500 = £3{,}500$$
$$Z\text{'s} \quad ,, \quad ,, \quad ,, \quad = \tfrac{4}{15} \times 10{,}500 = £2{,}800$$

1st Case. Net loss to firm by Z's insolvency $= £300$
$$\therefore \text{ Total loss borne by } X = £4{,}200 + \tfrac{6}{10} \times 300 = £4{,}380$$
$$\therefore X \text{ should receive } £6{,}000 - £4{,}380 = \mathbf{£1{,}620}$$

Also Total loss borne by $Y = £3{,}500 + \tfrac{4}{10} \times 300 = £3{,}620$
$$\therefore Y \text{ should receive } £4{,}000 - £3{,}620 = \mathbf{£380}$$

2nd Case. Net loss to firm by Z's insolvency $= £100$
$$\therefore \text{ Total loss borne by } X = £4{,}200 + \tfrac{6}{10} \times 100 = £4{,}260$$
$$\therefore X \text{ should receive } £6{,}000 - £4{,}260 = \mathbf{£1{,}740}$$

Also Total loss borne by $Y = £3{,}500 + \tfrac{4}{10} \times 100 = £3{,}540$
$$\therefore Y \text{ should receive } £4{,}000 - £3{,}540 = \mathbf{£460}$$

3rd Case. Net loss to firm by Z's insolvency $= £1{,}800$
$$\therefore \text{ Total loss borne by } X = £4{,}200 + \tfrac{6}{10} \times 1{,}800 = £5{,}280$$
$$\therefore X \text{ should receive } £6{,}000 - £5{,}280 = \mathbf{£720}$$

Also Total loss borne by $Y = £3{,}500 + \tfrac{4}{10} \times 1{,}800 = £4{,}220$
$$\therefore Y \text{ should pay in } £4{,}220 - £4{,}000 = \mathbf{£220}$$

EXAMPLE (iii)—

P. Dickson was a partner in the following firms, which, owing to the bankruptcy of Dickson, were wound up.

Firm	Kind of Partner.	Capital.	Dickson's Capital.	Loss.	Dickson's Share of Loss.
A & Co.	Ordinary	£12,000	£4,000	£10,000	One-half
B & Co.	,,	£8,000	£3,000	£10,800	One-third
C & Co.	Limited	£10,000	£2,800	£12,000	One-quarter
D & Co.	,,	£16,000	£2,000	£9,000	One-sixth

The net surplus of his private estate was £642. Assuming the remaining partners were solvent, what amounts are due to or from the firms ?

$$\text{Amount owing to A \& Co.} = \tfrac{1}{2} \times 10{,}000 - £4{,}000 = £1{,}000$$
$$,, \quad ,, \quad \text{B \& Co.} = \tfrac{1}{3} \times 10{,}800 - £3{,}000 = £600$$

One-quarter of the loss of C & Co. is in excess of Dickson's capital, but being a limited partner, the latter is not liable for losses beyond the loss of his capital.

Amount due from D & Co. $= £2,000 - £\frac{1}{6} \times 9,000 = £500$

Thus, £1,142 is available for payment to A & Co. and B & Co.

∴ Amount to be paid to A & Co. $= £\frac{10}{16} \times 1,142 = £713$ 15s.

and „ „ „ B & Co. $= £\frac{6}{16} \times 1,142 = £428$ 5s.

EXAMPLE (iv)—

The firm of Rosenberg & Hart suspended payment. The assets realized £12,800 and the liabilities, including Rosenberg's capital, £10,000, and Hart's capital, £8,000, amounted to £42,000. Rosenberg and Hart were only able to pay into the firm from their private estates £600 and £540 respectively. Preferential claims, together with secured debts, amounted to £4,400. How much in the £ (to nearest ¼d.) were the unsecured creditors entitled to receive ?

Loss incurred by the firm	$= £29,200$
Rosenberg's contribution towards loss	$= £10,600$
Hart's „ „ „	$= £8,540$
∴ Loss borne by creditors	$= £10,060$
Amount owing to creditors	$= £24,000$
∴ Amount available for payment of debts	$= £13,940$
∴ Amount owing to unsecured creditors	$= £19,600$
Amount available for payment to unsecured creditors	$= £9,540$
∴ Amount in the £ received by unsecured creditors	$= £\frac{954}{1960}.$
	$=$ 9s. 8¾d.

48. RECONSTRUCTION AND AMALGAMATION OF LIMITED COMPANIES.

Reconstruction is the name given to the winding up of an old company and the forming of a new company to carry on the business. The purposes for reconstruction are, chiefly : (1) to raise fresh capital by exchanging fully-paid shares in the old company for partly-paid shares in the new company ; (2) for amalgamating two or more companies ; (3) to induce creditors to accept shares or debentures in payment for their claims.

Amalgamation is the name given to the combining of two or more companies into one new company, which takes over the liabilities of the old companies and issues shares in exchange for shares in the old companies. The numbers of fully-paid shares issued to the shareholders should be approximately proportional to the amounts obtained by deducting the totals owing to sundry creditors from the estimated value of the assets in each case.

Example (v)—

A company whose capital consisted of 100,000 £1 shares, fully issued and paid, went into liquidation. A new company took over the business for £45,000 payable in £1 shares credited with 15s per share, together with £20,000 cash in order to defray liquidation expenses and to discharge creditors. In what way should the shares of the new company have been distributed among the shareholders of the old company ? If 60,000 fresh £1 shares had been issued and 15s. per share called, and if duty, fees, and additional expenses had amounted to £3,800, what would have been the working capital of the new company ?

Number of shares included in purchase price = 45,000 × $\frac{4}{3}$ = 60,000.

∴ **3 shares** in the **new company** should have been distributed for every **5 shares** in the **old company.**

$$\begin{aligned}\text{Amount called up on fresh shares} &= £60,000 \times \tfrac{3}{4} &&= £45,000\\ \text{Total of cash payments} &= £20,000 + £3,800 &&= £23,800\\ ∴ \text{ Working capital} && &= \mathbf{£21,200}\end{aligned}$$

Example (vi)—

Three companies, X, Y, and Z, amalgamate. X's capital consists of £80,000 in fully paid £1 shares ; Y's, £60,000 in fully paid £1 shares ; and Z's, of £100,000 in fully paid £10 shares. The total assets are estimated at £52,000, £45,000, and £74,000 respectively ; and the total amounts owing to sundry creditors are £7,000, £6,000, and £9,000 respectively. What should be the share capital of the new company in order to represent the total value of the three businesses ? In what way should fully paid £1 shares be allotted ?

$$\begin{aligned}\text{Share capital in new company} &= £45,000 + £39,000 + £65,000\\ &= £149,000\end{aligned}$$

Shareholders in X should be given 9 new shares for every 16 old shares.

| ,, | Y | ,, | ,, | 13 | ,, | ,, | ,, | 20 | ,, | ,, |
| ,, | Z | ,, | ,, | 13 | ,, | ,, | ,, | 2 | ,, | ,, |

Example (vii)—

Two companies, A and B, amalgamate. A's capital is £400,000 in fully paid £1 shares ; assets, £280,000 ; liabilities to sundry creditors, £30,000. B's capital is £320,000 in fully paid £1 shares ; assets, £130,000 ; liabilities to sundry creditors, £18,000. It is decided that shareholders in A are to be given 3 new shares for every 4 old, and shareholders in B, 3 new shares for every 8 old. How much per old share should be paid to the new company in each case, in order that the new shares should be fully paid ?

$$\begin{aligned}\text{Total of assets less liabilities to sundry creditors} &= £250,000 + £112,000\\ &= £362,000\end{aligned}$$

A's shareholders are allotted 300,000 new shares.
400,000 shares in A are worth £250,000.
∴ On 400,000 shares in A, £50,000 must be paid.
∴ On 1 share in A, 2s. 6d. must be paid.
B's shareholders are allotted 120,000 new shares.
320,000 shares in B are worth £112,000.
∴ On 320,000 shares in B, £8,000 must be paid.
∴ On 1 share in B, 6d. must be paid.

Ansr.—3 fully paid £1 shares in new company should be exchanged for 4 shares in A, together with 10s.

3 fully paid £1 shares in new company should be exchanged for 8 shares in B, together with 4s.

TEST EXERCISES X

(1) £42,530 6s. 3d. is available for distribution among unsecured creditors to whom a total of £75,400 is owing. How much in the £ do the latter receive ?

(2) A creditor has £5,646 13s. 4d. owing to him by a bankrupt who pays at 11s. 5½d. in the £. How much does the creditor receive ?

(3) A bankrupt is able to pay at the rate of 7s. 9¼d. to his unsecured creditors. A creditor to whom the sum of £1,240 is owing, holds securities which realize £775 10s. How much in all does the creditor receive ?

(4) A and B are unsecured creditors of a certain bankrupt. The amounts owing to them are £11,240 and £7,600 respectively. If A receive £6,509 16s. 8d., what should B receive ?

(5) A certain merchant is declared a bankrupt. He owed X £1,400, of which £775 is secured, and he owes Y £1,722, of which £872 is secured. If X receive £1,155 4s. 2d. in all, what total amount should Y receive ?

(6) A bankrupt paid at the rate of 8s. 11d. to his creditors, but later a debt of £1,412 10s., which had been written off, realized 7s. 4d. in the £. The additional expenses amounted to £23 2s., and the original sum owed by the bankrupt to the ordinary creditors was £3,440. What additional amount in the £ to the nearest ¼d. should the latter receive ?

(7) A bankrupt's liabilities (including preferential claims) amounted to £7,280 and his assets to £4,542. Preferential claims to the value of £954 were paid, the expenses of winding up the business amounted to £173 13s. 4d., and of the remaining liabilities, £2,152 was fully secured. What should an ordinary creditor receive to whom was owing £732 11s. 9d. ?

(8) A bankrupt owes £18,476. His assets are : £84 12s. 6d. cash ; premises valued at £2,840 ; appliances, valued at £2,200 ; stock, valued at £1,160 ; outstanding debts, total £4,657. The premises, appliances, and stock realized 6 per cent. above, 10 per cent. below, and 8 per cent. above the estimated values respectively. Of the debts, one for £1,360 realized 12s. 4d. in the £, one for £698 realized 15s. 8d. in the £, and the others realized the full amounts. The legal and other expenses amounted to £425 7s. and preferential claims to £726 12s. What dividend in the £ could be paid on the assumption that the bankrupt's creditors were unsecured ?

(9) Turney, Thompson & Alton traded in partnership, sharing profits and losses, ⅔, ⅓, and ₁₅₆ respectively. They decided to dissolve partnership on 31st December, 1919, when their Balance Sheet showed as follows—

	£		£
Turney, Capital Account	2,860	Sundry Debtors	3,720
Thompson ,, ,,	1,950	Stock	1,970
Sundry Creditors	2,460	Cash	265
		Alton, Capital Account	1,315
	£7,270		£7,270

The book debts realized £3,160 and the stock £1,235. What amounts should Turney and Thompson receive and Alton pay ?

(10) On dissolving partnership, the partners A, B, and C have £4,000, £3,200, and £1,500 capital respectively in the firm. By agreement, they share losses in the ratios 9 : 6 : 5. The net loss is £8,000. What are the net amounts due to A and B if (1) C is unable to contribute from his private estate ; (2) C can pay to the firm the balance of his share of the losses ?

(11) Referring to the previous question, what would A and B receive from or pay to the firm had C overdrawn his capital to the extent of £500 and had only been able to pay, all told, the sum of £846 to the firm ?

(12) James Ranton is a partner in two firms, having total capitals of £12,000 and £8,400, his capital being £4,200 and £1,800 respectively. He is liable for one-half the losses of the first firm and to one-quarter the losses of the second. Ranton becomes insolvent and the firms dissolve partnership, incurring losses of £14,000 and £7,800 respectively. How much of the surplus of Ranton's private estate, £842 12s. 6d., is each firm entitled to receive ?

(13) Referring to the previous question, what additional loss by Ranton's insolvency is incurred by a partner in the first firm, having £4,500 capital, the remaining partners being solvent ?

(14) S. Davey, who was a partner in the following firms, became insolvent and the firms were wound up—

Firm.	Kind of Partner.	Capital.	Davey's Capital.	Loss.	Davey's Share of Loss.
P & Co.	Ordinary	£8,600	£2,000	£8,000	One-third
Q & Co.	,,	£7,200	£2,400	£4,000	One-half
R & Co.	,,	£5,000	£2,000	£8,500	One-half
T & Co.	Limited	£10,000	£1,500	£2,500	One-fourth

The net surplus of Davey's private estate was £385 12s. What sums should Davey receive from Q & Co., and T & Co., and what should he pay to P & Co. and R & Co. ?

(15) A, B, C, and D were in partnership with £5,000, £4,000, £1,800, and £1,200 respectively and losses to be borne were ½, ⁴⁄₁₅, ⅕, ⅟₆ respectively. A loss of £10,500 having been sustained, the firm was wound up. C and D were only able to pay £116 15s. and £209 4s. respectively from their private estates. What are the net amounts received by A and B respectively ?

(16) Layton & Cooper suspended payment, and their liabilities and assets were stated as follows—

Liabilities.		£	Assets.	£
Sundry Trade Creditors		5,420	Freehold Property	6,400
Sundry Cash Creditors		1,396	Stock	5,000
Loans		5,000	Equipment	570
Capital—			Cash in Hand	76
Layton	£2,000		Sundry Debtors	1,170
Less net loss	£ 800			
		1,200		
Cooper	£800			
Less net loss	£600			
		200		
		£13,216		£13,216

The realization of the assets compared with the above estimates were : Property, £350 above ; Stock, £1,480 below ; Equipment, £175 below ; Sundry Debtors, £586 below. The loans were partly secured by assets which realized £4,200. The expenses of the realization of the assets amounted to £594 and preferential claims amounting to £620 were paid. How much in the £ (to the nearest farthing) should the unsecured creditors have received if (1) neither partner could contribute, (2) Layton's surplus of his private estate was £185 and Cooper's £432 ?

(17) Referring to the data of the previous question, had the property realized £8,600, what should Layton receive from and Cooper pay into the firm, losses being shared in the ratio 4 : 3 ?

(18) A company whose capital consisted of 70,000 fully paid £1 shares and 5,000 fully paid preference shares of £10 each went into liquidation. A new company took over the business for £70,000 payable in £1 shares credited with 17s. 6d. per share, together with £15,000 cash to defray expenses and discharge creditors. In what way should the new shares be distributed, reckoning 1 preference share equivalent to (1) 10 ordinary shares, (2) 14 ordinary shares ?

(19) A company was wound up and the liquidator was left with £62,425 to return to the shareholders. The capital was 4,500 preference shares of £10 each and 100,000 ordinary shares of £1 each. What amount should be returned per 100 ordinary shares (a) if holders of the preference shares have a preferential right to the return of capital ? (b) if they do not ?

(20) Two companies amalgamated. The capital of the first consisted of 120,000 shares of £1 each, 16s. paid up, and that of the second 80,000 shares of £1 each, 12s. 6d. paid. Profits available for distribution amounted to £15,600 and were divided in proportion to paid-up capital. What dividend was received by a man who held 100 shares in the first company, and by another who held 250 shares in the second company ?

(21) Three companies, the following particulars of which are given, amalgamate—

Company.	Capital.	Assets.	Liabilities to Sundry Creditors.
A & Co.	120,000 £1 shares	£75,000	£5,000
B & Co.	100,000 £1 shares	£87,400	£7,400
C & Co.	8,000 £10 shares	£66,200	£6,200

What should be the share capital of the new company in order to represent the total value of the three businesses, and in what way should fully paid £1 shares be allotted ?

(22) Referring to the previous question, if the paid-up capital of the new company be equivalent to the total value of the businesses and each £1 share be credited with 15s. paid, what should be the nominal capital ? Also, in this case, in what way should the new shares be allotted to shareholders of the original companies ?

MISCELLANEOUS EXERCISES

(Arranged approximately in order of difficulty.)

(1) What is the net price, in English money, of 33 hectolitres of wine at 12·74 francs per litre, if 7½ per cent. discount is allowed on the gross price. (Suppose 55·2 francs = £1.)

(2) A debt of £512 was left unpaid for three years. How much was due to the creditor at the end of that time, reckoning compound interest at 6 per cent. per annum ?

(3) The nominal capital of a company consisted of 180,000 £1 shares, of which 52,500 were unissued, and 17s. 6d. had been paid up on each of the issued shares. The unissued shares were cancelled and money returned to the shareholders, so that 13s. 4d. was now paid up on each share. What was the new nominal capital and the new paid-up capital ?

(4) Cheese is bought at £8 8s. per cwt. At what price per lb. must it be sold to yield a profit nearest to 15 per cent. on the cost price ?

(5) A person deposits sums of money in the Post Office Savings Bank as follows : 10th February, £12 15s. ; 23rd March, £15 6s. ; 9th June, £10 ; 28th September, £20 10s. What interest will be due on 31st December, if interest at the rate of 2½ per cent. per annum is allowed on every complete pound deposited, and commences on the first day of the month next following the deposit ?

(6) One-third of a business was owned by A, one-fourth by B, one-fifth by C, and D owned the remainder. D retired, and his share was divided among the other partners in proportion to the shares they already held. What fractions of the business did A, B, and C respectively own afterwards ?

(7) The debts of a bankrupt amount to £1,057 5s. 3d., and his assets consist of property worth £456 7s. 8d. and an undiscounted bill of £256 10s. due 4 months hence, discount being reckoned at 7 per cent. How much in the £ can he pay his creditors ?

(8) Given that the interest on £100 for 8 days at 4½ per cent. is £0·0986301, find the interest on £100 at the same rate for 2 days, for 5 days, and for 7 days, giving each to six places of decimals, as correct as possible.

Use these results to find the interest on £200 at the same rate for 257 days.

(9) On account of goods purchased, a man owed to a certain firm the following amounts : £212 10s. due 4th June ; £346 11s. 3d. due 20th June ; £194 17s. 4d. due 27th June ; and £547 1s. 6d. due 11th July. On what day should he pay the total so that there should be no loss of interest to either party ?

(10) Corn dealers offered to buy wheat either at 75s. per quarter or at £16 16s. per ton. Which offer should be preferred by a farmer who has wheat for sale which weighs 61 lbs. per bushel ?

(11) Construct tables of nine multiples from the following equivalents—

| 1 Km. | = ·62138 mile ; | 1 mile = 1·6093 Km. |
| 1 hectare | = 2·47114 ac. ; | 1 acre = ·40468 hectare. |

Using the tables, express 274 Km. in miles and yards; 58 ml. 550 yd. in Km. ; 7·38 hectare in acres, roods, square poles ; 19 ac. 1 rd. 28 sq. pl. in hectares.

(12) A ship whose cargo capacity was 1,650 tons (40 cub. ft.) was chartered at 38s. 6d. per ton plus 10 per cent. The ship carried 1,375 tons of cargo, the bills of lading being at the following rates : 605 tons at 42s. 9d. plus 10 per cent. ; 523 tons at 39s. 6d. plus 10 per cent. ; 247 tons at 36s. 3d, plus 10 per cent. Calculate the amount of the dead freight,

(13) What is the price of 6½ per cent. stock, if £2,340 invested produces an income of £156 ?   (Brokerage, ⅛ per cent.)

(14) The issued capital of a company consists of a number of paid-up £5 ordinary shares.   The results of a year's working, as quoted in a newspaper, were as follows : Brought forward, £1,093 16s. 2d. ; profits, £29,740 11s. 10d. ; dividend, 10 per cent. and a bonus of 2½ per cent. ; to reserve, £10,000 ; carried forward, £4,584 8s.   Find the number of shares issued.

(15) A man bought 550 shares in a company at 28s. 6d. per share, and then 440 more at 30s. each.   If he afterwards sold half of them at 29s. 3d. each and the other half at 31s. 3d. each, find the average profit he made on each share.   (Brokerage, 3d. per share.)

(16) Property valued at £1,475 is insured for £1,200.   Damage is done, to repair which cost £115 11s. 4d.   How much could be claimed in respect of the insurance ?

(17) The annual cost of warehousing, apart from loss of interest, is £340 ; and the average value of stock is £8,400.   The average stock is turned over 3·42 times during the year.   Calculate the total cost, including loss of interest at 6 per cent. per annum, of warehousing each £100 worth of stock.

(18) Find (a) graphically, (b) by calculating the sum invested, that yields £1, which is the best investment of the following : 5½ per cent. stock at 93 ; 4½ per cent. debentures at 77½ ; 6 per cent. preference shares of £1 each at $\frac{15}{16}$.

(19) A man borrowed £654 on 10th March.   The interest up to 24th March was at 5½ per cent. ; from 24th March to 7th April, at 6 per cent. ; from 7th April to 14th April, at 6½ per cent.   What sum should have been paid on 14th April as repayment of the loan together with interest ?

(20) A, B, C, and D having capitals of £10,000, £4,000, £2,600, and £1,400 respectively, agree to pay interest at 6 per cent. on their capital, and to share profits and losses in the ratios 5 : 4 : 2 : 1.   At the end of the year, after allowing for all charges including interest on capital, there is a net loss of £1,022 10s.   If the partners desire to start the next year without an adverse balance, find what sums should be paid by or to the firm in the case of each partner.

(21) A man makes the following investments : £2,400 of 4½ per cent. stock at 65, £1,900 of 5 per cent. stock at 88¼.   Find, to the nearest penny, the average interest he gets on each £100 sterling invested.   (Brokerage, ½ per cent.)

(22) A cargo of 80 bales of wool, of average weight 3 cwt. 14 lb., and valued at 1s. 1¼d. per lb., is shipped from Sydney to London.   The consignor pays shipping and wharfage at 1s. 3d. per bale, insurance for £1,200 at 17s. 6d. per cent., and freight at 11s. 6d. per cwt.   The wool is sold by the London agent at 1s. 6¾d. per lb.   After deducting his commission at 2 per cent., and paying £15 for various expenses, the agent remits the net proceeds of the sale to the consignor.   What profit does the latter make ?

(23) A partnership was formed by A with £6,000 capital, B with £5,000, and C with £1,000.   It was arranged that C should receive 20 per cent. of the net profit for managing the business, and that the remainder of the profit should be divided among the three partners in proportion to their respective shares of the capital.   At the end of the year, C received in all £426 13s. 4d.   What was the total profit, and how much did A and B receive ?

(24) The share capital of a company is £800,000.   The net profit on six months' working was £64,361, and £17,761 was brought forward from the last account.   £28,928 was placed to reserves, etc., and a dividend for the half-year at the rate of 8 per cent. per annum was paid.   How much remained to be carried forward ?

(25) Make out an account sales of 450 bags of rice ex *Persia*, sold by B. Dexter, London, by order and for account of Messrs. Murkin & Co., Calcutta—

250 bags, gross 488 cwt. 2 qr. 8 lb., tare and draft 11 cwt. 3 qr. 16 lb., at 36s. per cwt. ;

200 bags, gross 390 cwt. 3 qr. 10 lb., tare and draft, 9 cwt. 1 qr. 4 lb., at 38. per cwt.

Charges : Dock dues, £9 5s. 6d. ; rent, £2 3s. 4d. ; insurance on £1,900 at 2s. 9d. per cent. ; sale expenses, 3d. per bag plus 80 per cent. ; cartage, 10d. per bag ; commission 2½ per cent.

(26) A merchant has a debt of 10,000 dollars to discharge in New York. Find what it will cost him in English money (1) if he remits direct to New York at 3·95 dollars for £1 ; and (2) if he remits to an agent in Paris at 51·20 francs for £1, and his agent remits to New York at 12·18 francs for 1 dollar.

(27) A bill for £320 drawn on 7th March at 6 months was discounted on the following 17th April for £311 0s. 10d. What rate per cent. was charged ?

(28) Find the price per kilogramme in francs and centimes corresponding to a price of 1s. 3d. per lb., also find the price per lb. corresponding to a price of 3 francs 25 centimes per kilogramme. (1 Kg. = 2·20462 lb. and £1 = 52 fc. 81 ctm.)

(29) A man invested ⅓ of his capital in 5 per cent. stock at 88, ¼ of his capital in 4½ per cent. stock at 79⅜, and the remainder in 6 per cent. stock at 97¼. What is the average yield on the combined investments ?

⌐(30) A man sold £7,400 4½ per cent. stock at 82½ and with the proceeds purchased as many £1 shares as possible, at 1⁷⁄₁₆, on which dividend at 10 per cent. was paid. Reckoning brokerage at ⅛ per cent. and 6d. per share, respectively, calculate the increase of income.

(31) A company whose capital was 40,000 5 per cent. cumulative preference shares at £5 each and 300,000 ordinary shares at £1 each, was formed at the end of 1916. The net profits available for payment of dividends for the period 1917–1920 inclusive were : £2,500, £6,000, £15,000, and £32,000. What percentage dividends were paid at the end of each year ?

(32) Supposing a piece of cloth 40 yd. long to be worth 16s. 6d. per yard in England, and the forwarding charges and duty amount to 15 per cent. of the cost, what would be the cost per metre in France ? (£1 = 47·15 fc. ; 1 metre = 39·37 in.)

(33) Two companies propose to amalgamate. The capital of the first consists of 160,000 shares of £1 each, on which 16s. 6d. is paid up ; and that of the second consists of 120,000 shares of £1 each, on which 13s. 9d. is paid up. If profits be divided in proportion to the paid-up capitals, in what ratio will the profits have to be divided between the two companies ? If the profits amount to 8 per cent. of the total paid-up capital, what dividend per 100 shares in each of the companies should be paid ?

(34) Express in yen per ken, correct to the nearest sen, the price of silk equivalent to 17s. 11d. per yard. (Assume £1 = 7·49 yen ; 1 ken = 1·9884 yd.)

(35) Robert Harris, who became bankrupt, was an ordinary partner in three firms which were wound up. Particulars concerning the firms were as follows—

Firm.	Total Capital.	Harris's Capital.	Loss.	Harris's Share of Loss.
A & Co. . .	£8,000	£3,200	£7,200	one-third
B & Co. . .	£9,000	£4,000	£11,500	one-half
C & Co. . .	£10,000	£3,000	£16,400	one-quarter

The surplus of Harris's private estate, after deduction of expenses, was £352. What amounts are the firms B & Co. and C & Co. entitled to receive ?

(36) A dealer bought a quantity of coffee at a uniform price per cwt. He sold 35 per cent. of it at a gain of 8 per cent. ; 40 per cent. of it at a gain of 5 per cent. ; and the remainder at such a price that on the whole transaction he gained 4 per cent. At what percentage gain or loss did he sell the remainder ?

(37) A bill broker bought a bill for 70,000 francs at 61.95 and sold it at 53.92½. What was his gain ?

(38) Find, to 4 significant figures, a multiplier for converting a price in shillings per lb. into a price in francs per kilogramme 10 per cent. higher. (£1 = 49·45 francs ; 1 kilogramme = 2·205 lb.)

(39) Make out an invoice for the following goods shipped by T. Cox & Co., Manchester, to C. Logaz, Rio Janeiro, per *Swallow*, from Manchester—
   10 cases, each containing 24 pcs. 48 in. serges, each 52 yd., at 18s. 6d. per yard.
   Charges : Packing at 10s. 6d. per case ; dock charges, £3 11s. 6d. ; freight at 53s. 6d. per ton of 40 cub .ft. (each case, 4 ft. 6 in. × 4 ft. × 3 ft. 4 in.) ; marine insurance on £12,000 at 7s. 9d. plus 10 per cent. ; commission, 2½ per cent.
If T. Cox & Co. had made out the invoice on C. & F. terms, at what price per yard should the serges have been quoted ?

(40) What is the interest on £325 for the period 4th September to 10th February of the following year, reckoning interest at 6 per cent. per annum payable on 31st December ?

(41) Goods are insured for £3,250 at 16s. 3d. per cent. The sum of £3,250 is arrived at by increasing the actual value of the goods by 15 per cent. and adding the cost to insure. Calculate to the nearest £ the actual value of the goods.

(42) A bill for $2,400 was retired under discount at 6 per cent. per annum, 82 days before the legal date of maturity. How much should the acceptor pay in sterling, the rate of exchange being 3·93½ ?

(43) Wray & Clarke are partners in a business : their capitals are £5,000 and £3,500 respectively. By agreement, 6 per cent. interest is payable on capital, and net profits and losses divided in the ratio 3 : 2. During 1919, the net profit was 15 per cent. of capital. At the end of 1919, Brown joined the firm with £2,000 capital and paid for goodwill £1,275, which was added to the capitals of Wray & Clarke in proportion to their capital. Interest at 6 per cent. was still payable on capital, and the net profits were to be divided in the ratios 3 : 2 : 1. During 1920 the net profit was again 15 per cent. of the total capital. By how much did the incomes of Wray & Clarke for 1920 exceed those for 1919 and what amount did Brown receive ?

(44) The capital of a small manufacturing company consists of 1,050 shares of £10 each. It has also issued 6 per cent. debentures of £100 each, but two of them have to be paid off at the end of every year, out of the profits of that year. At the beginning of last year there were still 32 of these debentures, the business done during the year was £5,680, materials used in the manufacture cost 51 per cent., and other expenses were 28 per cent. of the business done. Find the greatest dividend per share that could be paid at the end of the year without drawing on reserve.

(45) A man subscribed for £2,000 6 per cent. stock issued at 102½ and payable as follows : 9th October, £22 10s. per cent. ; 14th October, £60 per cent. ; 20th January of the following year, £20 per cent. On 31st March of the latter year, dividend at the rate of 6 per cent. per annum was paid, it being considered that the premium was included in the first instalment. How much should the man receive, income tax at 6s. in the £ having been deducted ?

(46) Make out an account current to 31st December for the following transactions between Messrs. L. Newton & Co., Liverpool ; and S. Samuel & Co., New York. Reckon interest at 6 per cent. per annum.

Dr.

July 1. To Balance, $493·25.
Aug.15. ,, £500 90 d/s *ex* 3·82½ due 4th November.
Oct. 24. ,, £700 90 d/s *ex* 3·90 ,, 8th January.

Cr.

Aug.10. By Account Sales, due 9th October, $1,563·45.
Oct. 8. ,, ,, ,, ,, 7th December, $2,483·60.

(47) Calculate the date on which the balance of the following sums of money should be paid so as to make a complete settlement ?

Dr.	*Cr.*
Apr. 10. Goods, £246 5s. ; credit 2 months	June 17. By Cash . . . £150
May 25. ,, £412 10s. ; credit 3 months	July 31. ,, ,, . . . £350
June 4. ,, £384 ; credit 60 days	

(48) A man invested £4,000 partly in 5 per cent. stock at 90 and partly in 4½ per cent. stock at 80. The total income obtained was £223 2s. 6d. What sum was invested in each stock ?

(49) Lamb, Bilton, Dunn & Mann are partners, and share profits and losses : Lamb, one-third ; Bilton, one-quarter ; Dunn, one-quarter ; and Mann, one-sixth. On 31st December, 1919, the firm was dissolved, the balance sheet on that date being as follows—

	£		£
Lamb, Capital Account .	15,000	Property	22,500
Bilton, ,, ,, .	12,000	Stock	14,400
Dunn, ,, ,, .	6,600	Sundry Debtors . .	3,900
Sundry Creditors . .	8,200	Mann, Capital Account .	1,000
	£41,800		£41,800

The assets were realized as follows : Property, £24,000 ; stock, £10,660 ; sundry debtors, £3,370. The expenses of the realization amounted to £530. Calculate the amount Mann must pay into the firm and the amounts due to each of the other partners.

(50) Two cases each contain 6 pieces of cloth, each 52 yd. long. The cloth in the first is of better quality than that in the second, but in each separate bale the pieces are of uniform quality. Two pieces in the first are stained by sea-water and three in the second. The four sound pieces from the first are sold at 12s. 6d. per yard, and the three sound pieces from the second at 9s. 6d. per yard. The five stained pieces are sold in one lot at 5s. per yard. How is the proceeds of the damaged cloth proportioned between the two bales ? If the two bales be insured for £300, what sum could be obtained from the company with whom the insurance was effected ?

ANSWERS

TEST EXERCISES I

(1) £730 ; 26$\frac{8}{11}$%
(2) £432
(3) 17·94%
(4) 20$\frac{5}{6}$%
(5) 63$\frac{7}{11}$%
(6) £24,775
(7) £26,666 13s. 4d.
(8) £2 2s. 6d. ; £1 13s. 6d.
(9) 4$\frac{1}{2}$ in.
(10) (1) £200 ; £146 13s. 4d. ;
          £93 6s. 8d.
      (2) £653 6s. 8d. ; £573 6s. 8d. ;
          £493 6s. 8d.
(11) (1) £670 ; £385 ; £75 ; £70
      (2) £2,200 ; £1,150 ; £750 ;
          £700
(12) £1,417 5s.
(13) £4,200
(14) 13·6%

(15) £852 ; £693 ; £537
(16) 13·68% ; 15·14% ; 16$\frac{2}{3}$%
(17) £70 ; £108 ; £147
(18) £4,240 ; £1,413 6s. 8d. ; £800
(19) £9,083 19s. 4d. ; £7,556 0s. 8d.
(20) £7,913 19s. 4d. ; £6,386 0s. 8d.
(21) £787 10s.
(22) £779 15s. 10d. ; £398 14s. 5d. ;
      £167 10s. 1d.
(23) £385 9s. 3d.
(24) £833 6s. 8d. ; £666 13s. 4d.
(25) £50 8s. 4d. gain ;
      £40 6s. 8d. gain
(26) £262 10s. ; £31 17s. 6d. gain ;
      £27 12s. 6d. gain
(27) £945 ; £855 ; £895 2s. 6d. ;
      £773 12s. 6d. ; £628 2s. 6d.
(28) £2,160 ; £1,728 ; £1,512 ;
      £2,200 ; £1,760 ; £1,540

TEST EXERCISES II

(1) £350,000 ; £284,500 ; £260,750
(2) £5,950
(3) 1s. 8d.
(4) £3,040 ; £33 17s. 1d.
(5) £1,088 12s. 9d.
(6) £2,497 7s. 7d.
(7) £212 10s. ; £425 ; £11 8s. 3d.
(8) £31,500 ; £89,900 ; £126,000 ;
      £137,500 ; £137,500 ; £80,000
(9) £1,143 9s. 11d. ; £6,697 19s. 5d.
(10) £65 9s. 7d. ; £237 15s. 2d.
(11) 377 ; 177 ; 88 ; 44 ; 22 ; 17 ; 8 ; 4
(12) 7%
(13) 5·58% ; 5·49%
(14) 8$\frac{1}{2}$% ; £540
(15) 10$\frac{1}{4}$% ; £920
(16) £109 14s. ; £105 14s. 8d.
(17) £10 3s. 10d. ; £76 15s. ;
      £201 17s. 7d.
(18) £4,576 15s.
(19) £180,000 ; £331,500
(20) 7$\frac{1}{2}$% ; 6$\frac{1}{4}$% ; 0% ; 0% ;
      7$\frac{1}{2}$% ; 8$\frac{1}{2}$% ; 5% ; 0% ;
      7$\frac{1}{2}$% ; 7$\frac{1}{2}$% ; 25% ; 12$\frac{1}{2}$% ;
      7$\frac{1}{2}$% ; 7$\frac{1}{2}$% ; 13% ; 21$\frac{1}{2}$%
(21) £6,500 ; £38,500 ; £103,500 ;
      £461,500 ; £682,500

(22) 13$\frac{1}{2}$%
(23) 7% ; 7$\frac{1}{2}$% ; 0% ; 7% ; 10% ;
      8% ; 10% ; 13% ; 23%
(24) 7% ; 7$\frac{1}{2}$% ; 0% ; 7% ; 12$\frac{7}{8}$% ;
      0% ; 9$\frac{7}{8}$% ; 13$\frac{5}{58}$% ; 22$\frac{7}{8}$%
(25) 2$\frac{7}{10}$%
(26) 18s. 6d.
(27) £3,190 12s. 6d.
(28) 7$\frac{1}{2}$% ; £1,706 5s.
(29) £12,384 3s. 5d.
(30) £5,403 9s. 8d.
(31) £6,664 19s. 4d.
(32) £79 1s. ; £80 12s. ; 15$\frac{5}{17}$%
(33) £49 17s. 11d.
(34) 35$\frac{5}{13}$%
(35) £455,000
(36) Increased in ratio 17 : 18
(37) 13$\frac{1}{4}$%
(38) £131,250
(39) 40% ; 7$\frac{9}{13}$%
(40) 18s. 4d. ; 11 : 20 ; 11 : 12
(41) £59,375
(42) £79,500 ; £44,500
(43) £127 15s.
(44) £350,000 ; £116,666 13s. 4d. ;
      £16 0s. 10d. ; £36 13s. 4d.
      increase

137

TEST EXERCISES III

(1) 10½%
(2) £1 10s.
(3) £56 15s. 4d.
(4) £8 6s. 8d.
(5) 15·4%
(6) 17%
(7) 20%
(8) 7·9%
(9) 20%
(10) 17½%
(11) £52 10s.
(12) 6¼%
(13) £13 15s.
(14) £67 11s. ; £6 14s.
(15) 35·0%
(16) £2,140 19s. 4d.
(17) 8¼d.
(18) 18·35% ; £140 5s.
(19) 15·33% less
(20) £5 2s. 1d.
(21) £16 6s.
(22) £67 10s. 11d. cash
(23) £16 4s. cash

(24) £28 17s. 4d. cash
(25) £157 4s. 10d. cash
(26) £196 19s. 6d.
(27) £236 14s. 5d.
(28) 42 days
(29) 23rd June ; £1,896 5s.
(30) 17th June
(31) 1st January
(32) £875 6s.
(33) 10th January
(34) (1) 8·37% ; (2) 7·72%
(35) 10·5⁄12%
(36) 4·76%
(37) 12⅝%
(38) (1) 7·4⁄13% gain ; (2) 10·10⁄13% loss ;
   20% loss
(39) 16·05%
(40) 9¼d.
(41) 28⅟₇%
(42) 4·575%
(43) 78 days ; 4·66 ; £1 18s. 8d.
(44) £722 8s. ; £541 10s. ; 20 days
(45) £13,454 ; £4 9s. 7d

TEST EXERCISES IV

(1) £2,014 11s. 7d.
(2) 6⅞d. per lb.
(3) £362 16s. 10d.
(4) £1,418 2s. 3d.
(5) £340 16s. 5d.
(6) £4,941 18s. 6d. ; £4,455 5s. 2d.
(7) £1,632 11s. 6d. ; £1,187 3s. 2d.
(8) $23·75 per cental
(9) £2,914 5s. 4d.
(10) £1,232 11s. 6d. ; 6·7%
(11) (1) £2,265 16s. ; £249 19s. 6d.
(12) £316 10s. 7d. *Dr.*
(13) £204 0s. 7d. *Dr.*
(14) £45 8s. 5d. *Cr.*
(15) £10 8s. 2d. *Dr.*
(16) £7 13s. 2d. *Cr.*
(17) $702·30 *Cr.*
(18) £2,908 19s. 6d
(19) £14,366 18s. 8½d.
(20) £26 0s. 8d.
(21) £2,550 13s. 8d
(22) £12 3s
(23) (1) £605 9s. 5d. ; £2,329 17s. 6d.
(24) £12 17s. 8d. per cwt.
(25) 9 tonnes 7·35 centners ;
   112 cwt. 2 qr. 10 lb.
(26) 26·375 ken ; 94 yd. 7·57 in.
(27) 12869·12 kg.
(28) (1) 127 ponds ; 101·77 okes
(29) 103 centners 2 punds ;
   83 centals 19 lb.

(30) 5·213 ; 35·2 bush. per acre
(31) (1) ·8526 ; (2) 1·7188 ;
   (3) 8·5402
(32) (1) 1s. 2·8d. per lb. ;
   (2) 6s. 4·7d. per yard ;
   (3) 20s. 1·9d. per gallon
(33) (1) 1·2249 ; (2) ·7202
(34) (1) 19·29 pesetas per metro ;
   (2) 4·02 pesetas per gramo
(35) 9s. 0¾d. per lb.
(36) 9s. 11d. per yard
(37) (1) 13·89 fcs. per m. ;
   (2) 20·54 fcs. per m. ;
   (3) 40·08 fcs. per m.
(38) (1) £9 18s. 10d ;
   (2) £211 3s. 11d. ;
   (3) £9 4s. 8d.
(39) 6,705 rupees 8¼ annas
(40) (1) 12 rupees 12¼ annas ;
   (2) 13 rupees 6¼ annas
(41) Fcs. 94172·38
(42) £464 1s. 8d. ; (1) £360 7s. 4d. ;
   (2) 2395·27 Mex. dollars
(43) £276 13s. 2d.
(44) (1) £3,511 10s. 9d. ;
   (2) 2 rupees 3¼ annas per yd.,
   38,180 rupees 2¼ annas
(45) 15846·2 m. at fcs. 11·26 per m. ;
   fcs. 178428·21
(46) 91·51 pesetas per suit ;
   45,755 pesetas

TEST EXERCISES V

(1) £1 6s. 7¼d.
(2) £1 6s. 5d.
(3) 17,595 sovs.
(4) (1) £48 19s. 6d. ; £65 9s. 5d.
(5) 664,766 sixpences
(6) £7,312 11s.
(7) ·63%
(8) 1,752 shillings
(9) 256 oz. Tr. 16 dwt. 10·5 gr.
(10) £502 19s. 7d.
(11) 2s. 7·2d.
(12) 1s. 4·8d.
(13) 5,376 pennies
(14) £412 12s. 6¾d.
(15) 260,417 oz. Tr. 6 dwt. 9 gr.
(16) £2,482,185 17s. 9d.

(17) (1) $1·50 ; 58⅜d. ;
    (2) $1·22 ; 71¾d.
(18) (a) $1·293 per oz. Tr.
    (b) fcs. 0·24 per gm.
(19) 59d. per oz. Tr. ; 65½d. per oz. Tr.
(20) 15·988 : 1
(21) ·402 oz. Tr.
(22) 6·05 gm.
(23) (1) $1 = 4·198 marks ;
    (2) 1 mark = 1·235 drachmae
    (3) 1 yen = 1·236 gulden
(24) (1) 364·90 Mex. dollars
    (2) £1 7s. 11½d.
(25) (1) fcs. 1230·41 ;
    (2) 75·03 kroner ;
    (3) 209·13 yen

TEST EXERCISES VI

(1) (a) 9d. ; (b) fcs. 5·27 ; (c) $3·57
(2) £4 17s. 10d.
(3) £1,056 13s. 2d.
(4) £133 16s. 6d.
(5) £132 0s. 5d.
(6) £26
(7) £56 2s. 9d.
(8) £56 4s. 9d.
(9) £695 2s. 1d.
(10) £696 19s. 2d.
(11) £419 5s. 7d. ; £409 16s. 7d.
(12) £572 11s. 7d.
(13) (a) 10th July ; (b) 25th May ;
    (c) 3rd August ; (d) 10th Aug.
(14) £793 13s.
(15) 7·17% per annum
(16) £3 3s. 10d. ; £6 13s. 9d. ;
    £4 1s. 9d. ; £8 5s. 4d.
(17) £398 12s. 5d. ; £554 9s.
(18) £1,444 16s. 9d.
(19) £4 ; 9·2% per annum

(20) (1) £30 0s. 1d. ; (2) £218 3s. 10d.
    (3) £13 4s. 4d. ; (4) £312 3s. 9d. ;
    (5) £367 4s. 6d.
(21) (1) 7634·27 florins ;
    (2) 3052·99 dollars ;
    (3) 3,014 dollars
(22) £772 7s. 6d.
(23) (1) fcs. 16·62 per dollar ;
    (2) $0·06 per franc
(24) £86 14s. 9d.
(25) 1666·51 kroner ; 9723·77 kroner
(26) 18217·23 kronor
(27) £9 12s. 8d.
(28) 4·21¾
(29) 4·03% per annum
(30) £41 13s. 4d.
(31) 25½² cents
(32) 22·06¾
(33) £2,578 3s. 4d.
(34) 22·89¾ kroner ; £21 9s. 6d
(35) 3·77

TEST EXERCISES VII

(1) (a) £810 15s. ;
    (b) £1,253 4s. 9d. ;
    (c) £1,759 15s. 11d. ;
    (d) £4,295 8s.
(2) (a) £795 18s. ;
    (b) £1,222 5s. 3d. ;
    (c) £1,721 14s. 1d. ;
    (d) £4,212 12s.
(3) (a) £1,245 10s. ;
    (b) £2,319 ;
    (c) £3,109 6s. ;
    (d) £5,520 11s. 3d,

(4) (a) £1,107 ;
    (b) £2,009 ;
    (c) £2,792 8s. ;
    (d) £4,945 18s. 9d.
(5) (a) £5,882 7s. 1d. ;
    (b) £3,877 9s. 11d. ;
    (c) £757 3s. 1d.
(6) £96 18s. 9d. ; £34 1s. 5d.
(7) £5 6s. 6d. ; £4 19s. 9d.
(8) (a) 1,189 shares ; (b) 276 shares ;
    (c) 8,791 shares
(9) £118 13s.

TEST EXERCISES VII—(*continued*)

(10) £5 18s. 8d.
(11) 59½ ; £510 7s.
(12) £20 16s. 8d.
(13) £7,493 ; £6,880
(14) 79
(15) £7,333 6s. 8d. ; £4,740 6s. 8d.
(16) £56 12s. 8d.
(17) 63⅛
(18) 103½
(19) £9,428 11s. 5d.
(20) £172 10s.
(21) £61
(22) N.S.W. 5¾% at 96
(23) 12% per annum
(24) £69 8s. 7d.
(25) (3), (2), (4), (1)

(26) £8,000
(27) £1,131 11s. 7d.
(28) £17 9s. 8d.
(29) £114 11s. d.
(30) 500 shares
(31) 18⅖%
(32) £6 8s. 4d.
(33) £7,224
(34) £1,400 ; £2,200
(35) 77½
(36) 15% ; £5 13s. 2d.
(37) £7,417 10s.
(38) £72 18s. 4d.
(39) £362 10s.
(40) £2,907 14s. 8d.

TEST EXERCISES VIII

(1) £165 5s. 8d.
(2) £336 11s. 3d.
(3) £29 12s. 6d.
(4) £192
(5) £73
(6) £8 11s.
(7) £14 9s. 4d.
(8) £3 3s. 4d.
(9) £15 10s.
(10) £6 5s. 7d.
(11) £7 1s.
(12) £4 16s. 8d.
(13) £3 6s. 2d.
(14) £237 5s. 10d.
(15) 7s. 10d.

(16) (1) £12 13s. 9d. ; (2) £10 5s. 9d.
(17) £53 4s. 9d.
(18) £7 1s. 8d.
(19) £1 1s. 2d.
(20) £61 5s. 4d.
(21) £164 14s. 5d.
(22) £31 0s. 8d.
(23) £72 17s. 4d.
(24) 5·7436
(25) Fcs. 51·20 per cm.
(26) £1 1s. 8d. dearer
(27) £4 0s. 1d. ; 4s. 2½d.
(28) £1 1s. 0¼d. per ton
(29) £24 11s. 11d.
(30) £281 3s. 10½d.

TEST EXERCISES IX

(1) £31 9s. 11d.
(2) 6s. 9d.
(3) £133 16s. 6d.
(4) £384 ; £2 1s. 9d.
(5) £1,614
(6) £1,711
(7) (1) £738 16s. 1d. ;
    (2) £577 1s. 9d. ;
    (3) £1,237 10s.
(8) 11·4%
(9) £7,570
(10) £871 5s.
(11) 18s. 11¼d.
(12) £2,000
(13) £704 ; £576
(14) £711 2s. 3d. ; £426 13s. 4d.

(15) £294 10s. 11d.
(16) £40 ; £254 10s. 11d.
(17) £65 9s. 1d.
(18) £13,066 13s. 4d. ;
    £1,933 6s. 8d. ;
    £450 ;
    £2,033 6s. 8d. ;
    £566 13s. 4d. ;
    £1,950
(19) 19s. 11d ; £6 1s. 1d. ;
    £8 5s. 3d.
(20) £12 12s. 10d.
(21) £75 9s. 3d.
(22) 17·121% ; 11·783% ; 6·361%
(23) £25 12s. 9d. ; £11 16s. ;
    £3 3s. 6d.

TEST EXERCISES X

(1) 11s. 3¾d.
(2) £3,235 1s. 5d.
(3) £955 19s. 7d.
(4) £4,401 13s. 4d.
(5) £1,389 1s. 8d.
(6) 2s. 10½d.
(7) £221 12s. 3d.
(8) 10s. 3¾d.
(9) £2,342 ; £1,518 6s. 8d. ;
   £1,660 6s. 8d.
(10) (1) £122 4s. 5d. ; £577 15s. 11d. ;
   (2) £400 ; £800
(11) A pays £518 17s 9d. ;
   B receives £64 17s. 9d.
(12) £799 15s. 7d. ; £42 16s. 11d.
(13) £1,153 19s. 6d.
(14) £400 ; £875 ; £379 11s. 4d. ;
   £1,281 0s. 8d.

(15) £1,014 8s. 4d. ; £811 10s. 8d.
(16) (1) 16s. 11d. ; (2) 18s. 8¼d.
(17) £837 2s. 10d. ; £72 2s. 10d.
(18) (1) 2 new shares for 3 old ;
   20 new shares for 3 old
   (2) 4 new shares for 7 old ;
   8 new shares for 1 old
(19) (a) £17 8s. 6d. ; (b) £43 1s.
(20) £8 11s. ; £13 13s. 11d.
(21) £210,000 fully-paid £1 shares ;
   7 new shares for 12 old ;
   4 new shares for 5 old ;
   15 new shares for 2 old.
(22) £280,000 £1 shares, 15s. paid ;
   7 new shares for 9 old ;
   16 new shares for 15 old ;
   10 new shares for 1 old

MISCELLANEOUS EXERCISES

(1) £704 10s. 2d.
(2) £609 16s. 0d.
(3) £127,500 ; £85,000.
(4) 1s. 8⅛d. per lb.
(5) 16s.
(6) 29/47, 15/47, 11/47.
(7) 13s. 4·46d.
(8) £·024658 ; £·0161644 ;
   £·086301 ; £6 6s. 9d.
(9) 27th June
(10) £16 16s. per ton.
(11) 170 m. 454 yd. ; 93·842 km ;
   18 ac. 0 rd. 38 sq. pl. ; 7·861
   hectares
(12) 29s. 3d. plus 10%
(13) 97
(14) 26,000 shares
(15) 7d.
(16) £94 0s. 5d.
(17) £2 18s. 9d.
(18) 6% pref. shares
(19) £657 14s. 0d.
(20) A rec. £173 19s. 2d.
   B pays £100 16s. 8d.
   C pays £14 8s. 4d.
   D pays £1 4s. 2d.
(21) £6 4s. 7d.
(22) £423 13s. 4d.
(23) £1,600 ; £640 ; £533 6s. 8d.
(24) £21,194.
(25) £1,500 9s. 4d.

(26) (1) £2,531 12s. 11d.
   (2) £2,378 18s. 2d.
(27) 7% per annum
(28) fcs. 7·28 per kg. ; 6¾d. per lb.
(29) £6 11s. 8d.
(30) £167 8s.
(31) 1¼%, nil ; 3%, nil ; 7½%, nil ;
   8¼%, 5⅜%
(32) fcs. 42·54 per m.
(33) 8 : 5., £6 12s., £5 10s.
(34) 13·34 yen per ken
(35) £707 7s. 4d. ; £444 12s. 8d.
(36) Loss of 3⅛%
(37) £168 2s. 6d.
(38) 5·997
(39) £11,935 4s. 1d. ; 19s. 0¼d. per
   yd.
(40) £8 10s. 9d.
(41) £2,803
(42) 601 13s. 10d.
(43) £163 2s. 6d., £110 5s. 0d.,
   £414 7s. 6d.
(44) 15s. 3d. per share
(45) £34 7s. 8d.
(46) $1086·82 Dr.
(47) August 10th
(48) £2,700, £1,300.
(49) £1,550 ; £13,900 ; £11,175 ;
   £5,575.
(50) £30 7s. 6d. ; £34 12s. 6d. ;
   £64 15s. 5d.

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